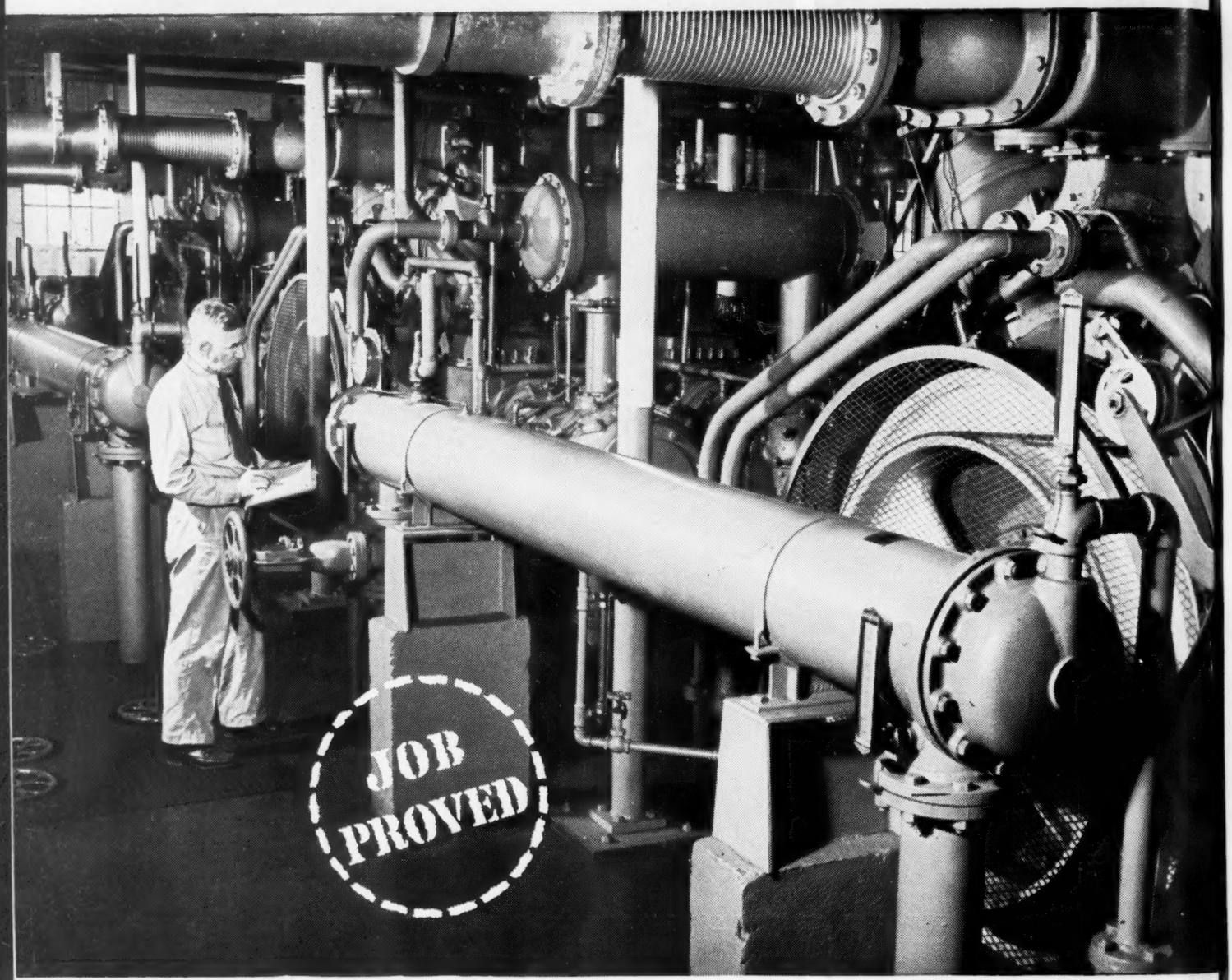
Coal Age

FEBRUARY, 1947

★ COAL--1946 AND THE FUTURE

Compressing Maintenance Problems



SUN COMPRESSOR LUBRICANT...

Keeps Compressors Operating Four Years on 24-Hour-a-Day Schedule

Twenty thousand and ten hours of trouble-free operation were piled up by one unit in a big, industrial plant operating a battery of heavy-duty 400 horsepower compressors. There was no time out except for routine inspections. Sun Oil was used from the very first hour these compressors were installed. When they were finally shut down for major overhauls, no wear was apparent and no major parts had to be replaced.

Sun "Job Proved" industrial lubricants are making similar impressive records in all kinds of industrial plants, keeping production on an even, round-the-clock basis, holding down maintenance and operating costs. If you have problems concerning the lubrication of compressors, power plants, machine tools or other industrial equipment — remember the Sun Engineer is at your service without obligation on your part. Just phone the nearest Sun office or write Dept. CA-2. . .

SUN OIL COMPANY · ***Philadelphia 3, Pa.***

Sponsors of the Sunoco News-Voice of the Air — Lowell Thomas

SUN

SUNOCO

INDUSTRIAL PRODUCTS

It rides like a cloud— on B.F. Goodrich rubber springs

A typical example of B. F. Goodrich product development

CALIFORNIA bus riders are now enjoying a new kind of velvet-ride comfort on rubber springs in this two-section "articulated" bus, along with such luxuries as lavatories, extra spacious head and leg room, foam rubber seats, and scenery-level windows. The manager of the bus line says this big 40-passenger unit rides better than any other motor vehicle on the road. Here's how it happened:

Years ago, B. F. Goodrich engineers (who believe that *anything* can be improved) had found it possible to absorb shock and vibration in factories by mounting heavy machines on rubber. Why not try to do the same thing for cars and busses with a rubber spring? They did — and came up with the spring that will add more to your riding comfort than anything since the air-filled tire replaced the solid tire years ago.

The spring consists of a metal cylinder filled with rubber, with a shaft in the center — with the rubber firmly bonded to both cylinder and shaft. The weight of the bus connected to the shaft makes it turn inside the cylinder, gives a twisting action to the rubber. Bumps and road shocks are smothered by the twisting rubber *before* they reach the bus frame.

In addition to rubber springs, this new Kaiser Coach is equipped with a lot of other B. F. Goodrich products — tires, Koroseal upholstery and floor covering, Koroseal and metal bellows between sections, and many more; a few of the hundreds of B. F. Goodrich developments that have brought increased comfort, safety and efficiency to the American people and American industry. *The B. F. Goodrich Company, Industrial Products Division, Akron, Ohio.*

Koroseal — Trade Mark, Reg. U. S. Pat. Off.

B.F. Goodrich

FIRST IN RUBBER

First in its Field....

THE FIRST NATIONAL CENSUS

Yes sir—good old **PENNSYLVANIA** took the lead in the first National Census, with a population of 434,373—Tennessee bringing up the rear with 35,691. Looks like a Philadelphia family in the old print! Enumerated as of August 1st, 1790, the Census covered 17 States, showing a TOTAL population of only 3,929,214. The last Census (1940) shows Pennsylvania standing SECOND among the States, with a population of 9,900,180 . . . and still growing!

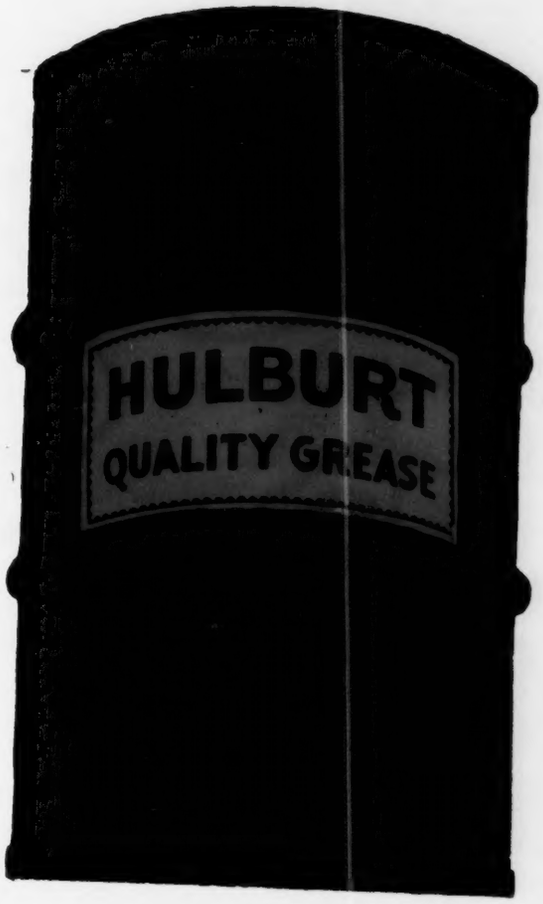
Take another popular Pennsylvania (Philadelphia) product . . . **HULBURT QUALITY GREASE.** From the very beginning it has always stood SECOND TO NONE in QUALITY and hence in its ability properly to lubricate Coal Mining Machinery. That's why its use has grown and grown...and is still growing! QUALITY is the reason why **HULBURT QUALITY GREASE** will always rank FIRST among coal operators who demand the BEST way of lubricating their mining machinery.

HULBURT OIL & GREASE COMPANY—PHILADELPHIA, PENNA.

Specialists in Coal Mine Lubrication

. . . a record of

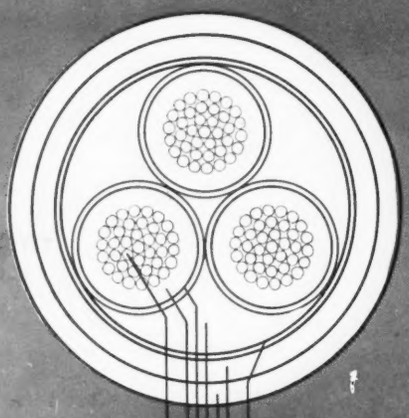
American Leadership



HULBURT

THE "FIRST NAME" IN

Quality GREASE



1. Rubber-filled core tape binder.
2. Hazard Submarine insulation—moisture-resisting, extra-tough and resilient, non-corrosive and long-aging. Has high dielectric strength.
3. Rubber-filled tape over each insulated conductor.
4. Saturated fillers to round out the core.
5. Tinned copper conductors.
6. Armor: Heavy non-metallic Armortite tapes between layers of asphalted jute, slushed with asphaltic-base plastic compound.
7. Spiralweave covering. Close loom-woven jacket of heavy cotton, fire-hose type, thoroughly saturated with asphaltum compound, flake mica finish.

for SAFE...SURE MINE POWER that helps KEEP PRODUCTION HIGH

HAZARD ARMORTITE

Custom-built to withstand the severe operating conditions encountered inside mines, Armortite also provides special installation advantages.

Located in the heart of an important mining area, Hazard has taken every advantage of its opportunity to design and build mining cables that are "tailor-made" to meet the requirements of the industry.

For example, take Hazard Armortite Mine Power Cable for inside power transmission and distribution. It's non-metallic armored, moisture-proofed . . . can be laid directly in a trench without conduit, run through pipe, or hung on messenger or supports inside the mine. Having neither lead sheath or steel armor wires, it's more simple to install and its light weight makes handling quick and easy. In more than twenty years, there has never been a service failure caused by faulty construction of Armortite.

Consult Hazard Engineers as to the type of cable to select for a specific application to assure maximum efficiency and service life.

Hazard Insulated Wire Works,
Division of The Okonite Company,
Wilkes-Barre, Pennsylvania.

HAZARD

insulated wires and cables for every mining use

4939

Coal Age

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DON'T SHORTEN ROPE LIFE

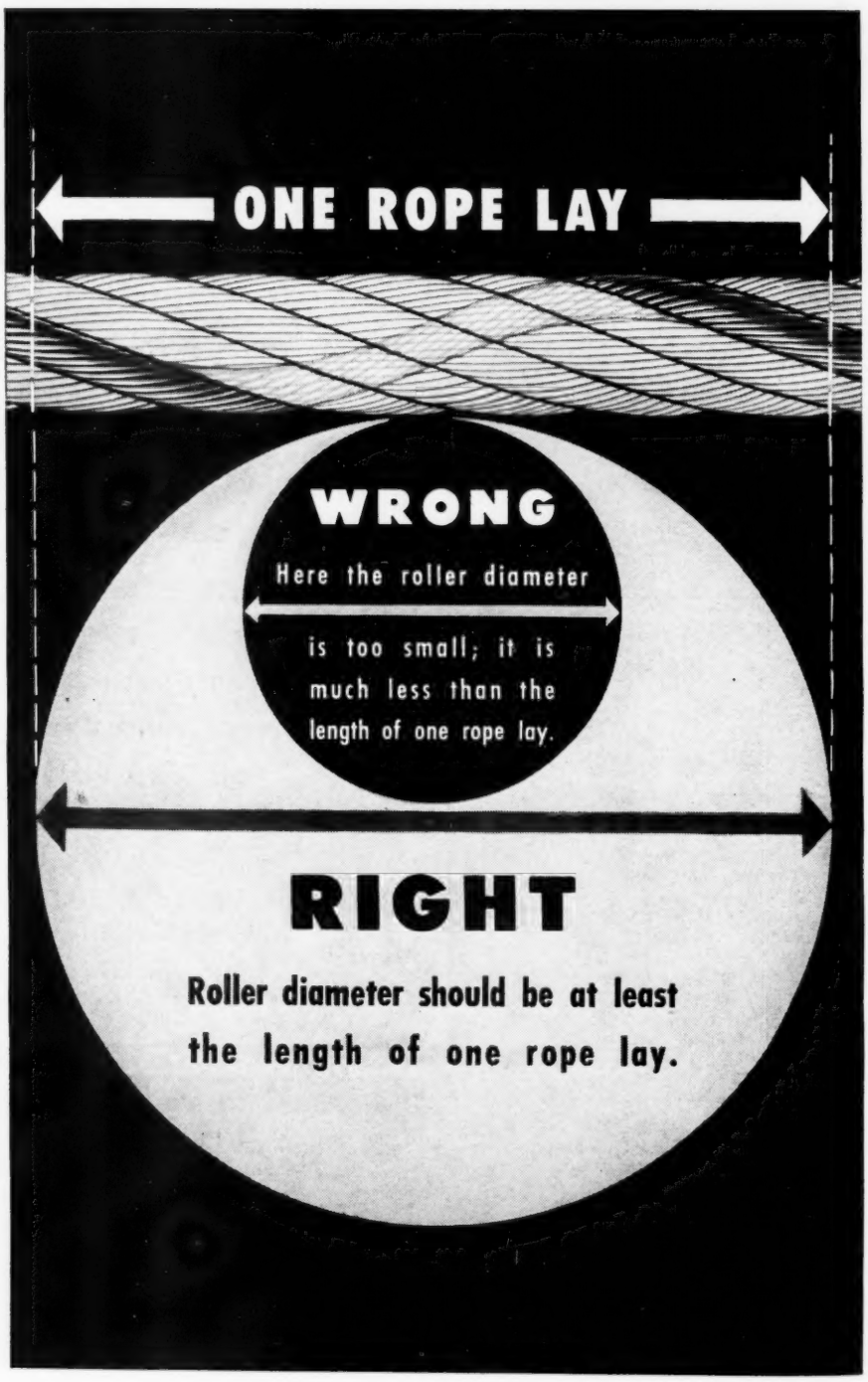
by using midget rollers

Good wire rope is precision-made equipment. It is built to last a long time. But whenever you run it over rollers that are too small, you are bleeding some of the life from your rope.

Preferably the roller diameter should be greater than the length of one rope lay. It should never be *less*. When the roller diameter is too small, it causes chatter, peening of the wires, and wire fatigue. It causes needless wear on both the rope and the roller.

On the other hand, when the roller is of the proper size, your line rides over it much more smoothly and quietly. There is less slapping. There is less *wear*. You'll also find it pays to use anti-friction bearings, and to keep the roller well-oiled, clean, and free-running.

Why not ask a Bethlehem field engineer to look over the rollers in your system? While he's there he'll be glad to check your sheaves and drums as well. His recommendations may help you lengthen the life of your rope.


ONE ROPE LAY
WRONG
Here the roller diameter
is too small; it is much less than the length of one rope lay.
RIGHT
Roller diameter should be at least the length of one rope lay.

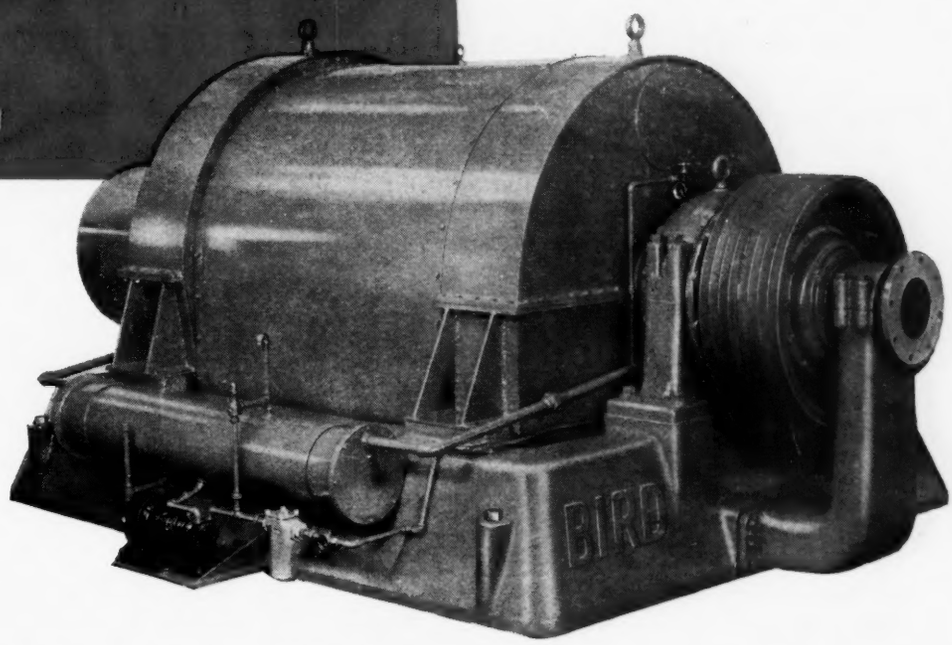
BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation

★ BETHLEHEM STEEL ★

When you think WIRE ROPE . . . think BETHLEHEM

This BIRD Is Your Best Bet For Drying Fine Coal



Here's what the Bird Continuous Centrifugal Filter does for you:

- it teams up with any cleaning system to dewater the fine coal just as it comes from the washers, without pre-screening
- it delivers the fine coal dry* and whole, all ready for blending with the larger sizes
- it puts the water in shape for immediate re-use
- it handles forty tons or more per hour, taking up less than 150 sq. ft. of space and operating at very low cost
- it runs continuously without parts replacements or shutdowns for overhaul, month in and month out.

**A minus ¼ plus 0 feed containing 6 to 8% minus 200 mesh fines is delivered with not more than 5% surface moisture.*

Now is a good time to find out what the BIRD can do to give you a better product and more of it per day at lower cost per ton. Get in touch with *Bird Machine Co., South Walpole, Mass.*

The BIRD Centrifugal FILTER

"THIS PUMP SET 11-YEAR Dewatering

In operation almost continuously since 1936, this A-C mine pump has required no major repairs

THINK WHAT THAT MEANS in savings of downtime and maintenance! Not only that — for these 11 years this all-bronze 9,000 gpm, 360 ft head single-stage pump has maintained its high efficiency . . . has effectively kept water from workings in a large coal mine.

Such a record can only be the result of sound equipment design, based on years of experience in building not only pumps, but coal processing, power and electrical equipment as well. Yes, you'll get top performance and year-after-year dependability of equipment when you buy from Allis-Chalmers.

You'll get real help, too, in getting lower operating costs and better tonnages. For Allis-Chalmers offers you sound, *unbiased* equipment recommendations . . . based on the requirements of *your* specific job.

Skilled engineers — coal industry specialists — are available now to help you plan tomorrow's equipment needs. Call your nearby A-C office. ALLIS-CHALMERS, MILWAUKEE 1, WIS.

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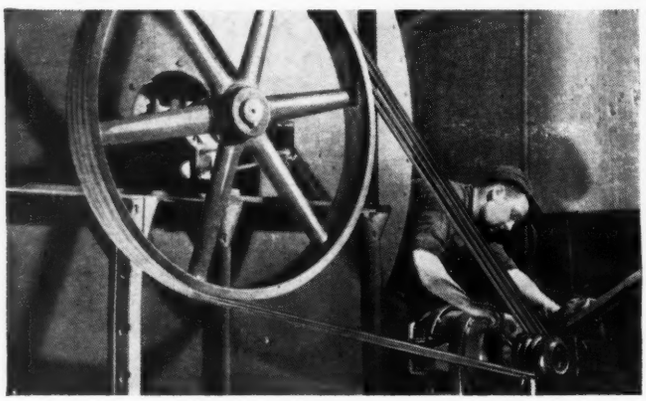
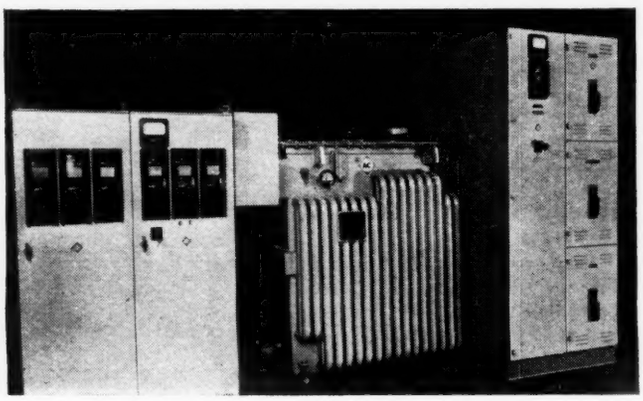


POWER TRANSMISSION

SUBSTANTIAL SAVINGS IN VENTILATION COSTS are possible with ample airways and modern fans, Allis-Chalmers motors and Texrope V-belt drives. Efficient Texrope drives provide speed ratios of 7:1 . . . permit use of lower cost higher speed motors. Exclusive duplex-sealed belt cover offers maximum V-belt durability in dusty, gritty locations. Texrope drives are shock-absorbing . . . protect bearings of both motor and fan. Belts available in Static-Resisting, Oil-Resisting, Oil-Proof types. **Send for Bulletin B6051G.**



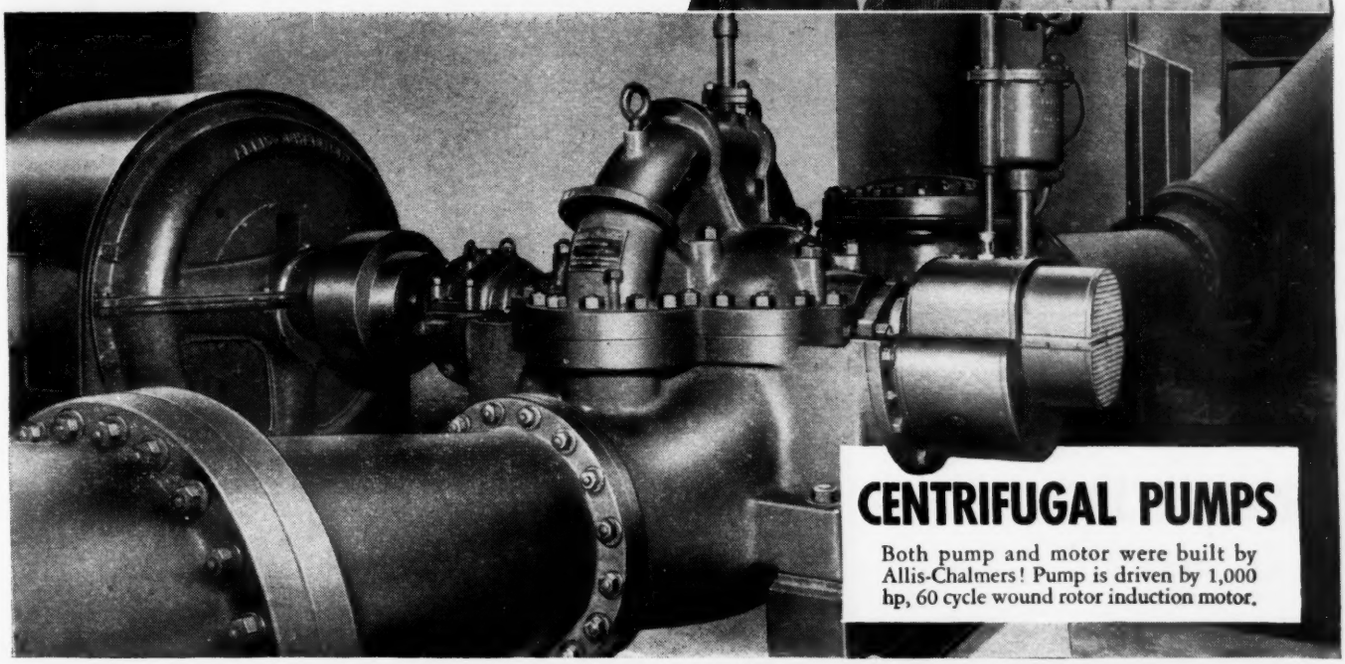
POWER DISTRIBUTION

BETTER VOLTAGE REGULATION and reduction of line loss and cable costs may be obtained with modern Allis-Chalmers metal-enclosed Unit Substations. Built for maximum safety . . . with no live parts exposed . . . these versatile units are available in combinations of switchgear and transformer elements to suit *any* installation requirement. Unit substations save power costs and increase efficiencies by bringing high voltages closer to load centers. Sizes 100 to 2,000 kva. **Send for Bulletin B6325.**

ALLIS-CHALMERS

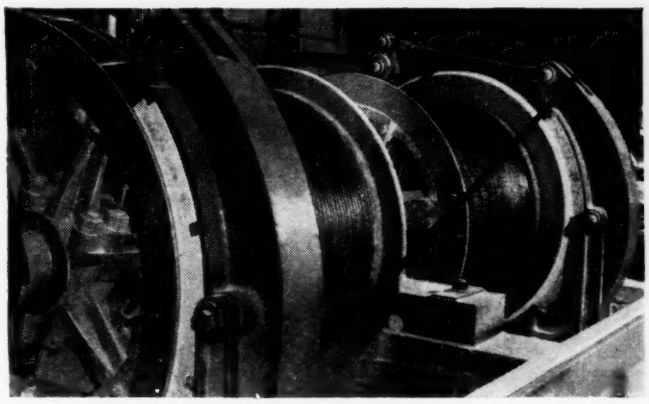
One of the Big 3 in Electric Power Equipment — Biggest of All in Range of Industrial Products

Record!"



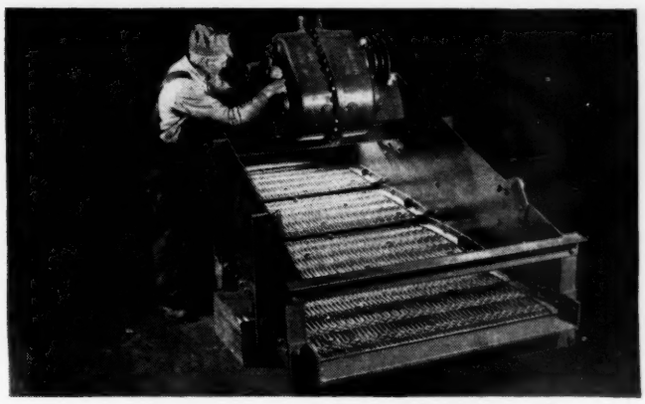
CENTRIFUGAL PUMPS

Both pump and motor were built by Allis-Chalmers! Pump is driven by 1,000 hp, 60 cycle wound rotor induction motor.



MINE HOISTS

MORE ECONOMICAL HOISTING can be obtained with Allis-Chalmers all-electric mine hoists for shaft, skip or slope installations. Allis-Chalmers has built hundreds of hoists, including many of the world's largest . . . has engineered installations that have helped operators greatly reduce hoisting costs. Sure, smooth operation under all load conditions is provided by automatic "Regulex" control. Allis-Chalmers builds *all* auxiliary equipment . . . furnishes *complete* hoist installations for *any* requirement.



BASIC PROCESSING

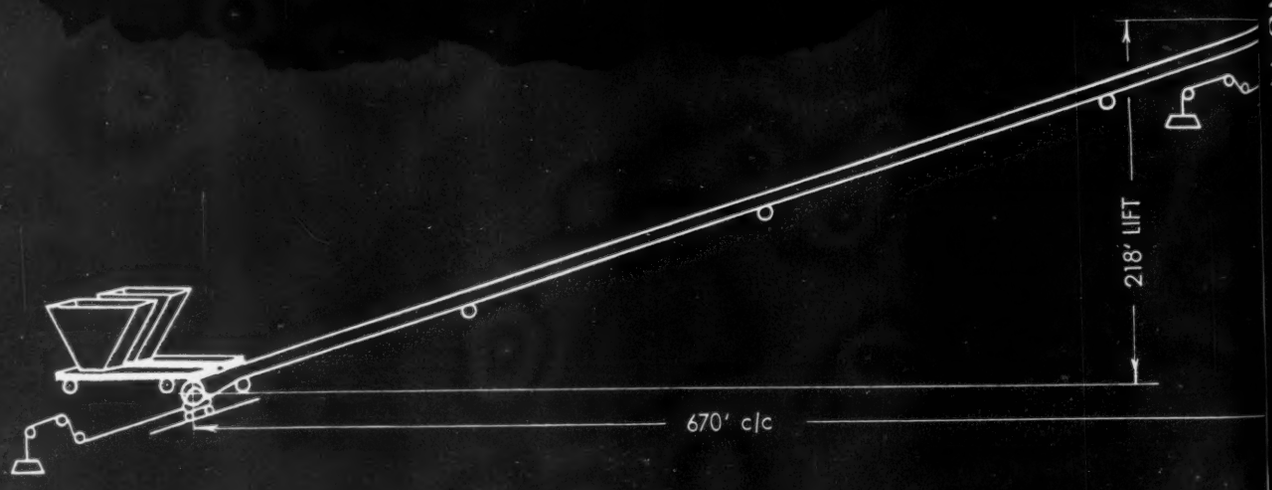
ESPECIALLY RECOMMENDED FOR DEWATERING small size coal is the compact Low-Head Vibrating Screen equipped with End-Tensioned Deck. Screens are tensioned longitudinally. Coal is distributed evenly over all of the screening area, resulting in better dewatering efficiency. All welded parts are "stress-relieved" for lasting strength. And the Low-Head saves space and installation costs because it operates horizontally . . . requires less headroom. Sizes 3 by 6 to 6 by 16 ft. **Send for Bulletin B6330.**

1847 1947
A CENTURY OF SERVICE
to Industry
THAT MADE
America Great

. . . builds for COAL

Here's a Nine-Year Lesson in Slope Haulage

A 428-foot lift – 450 tons per hour – up a 32% incline!



THE long life, high-tonnage capacity and continuous, trouble-free performance of slope-entry conveyor belt haulage in all types of mining are dramatically illustrated by the Goodyear installation in the Lillybrook Coal Company's mine at Affinity, West Virginia. Yet when first considered, back in 1938, this operation seemed to present many difficulties.

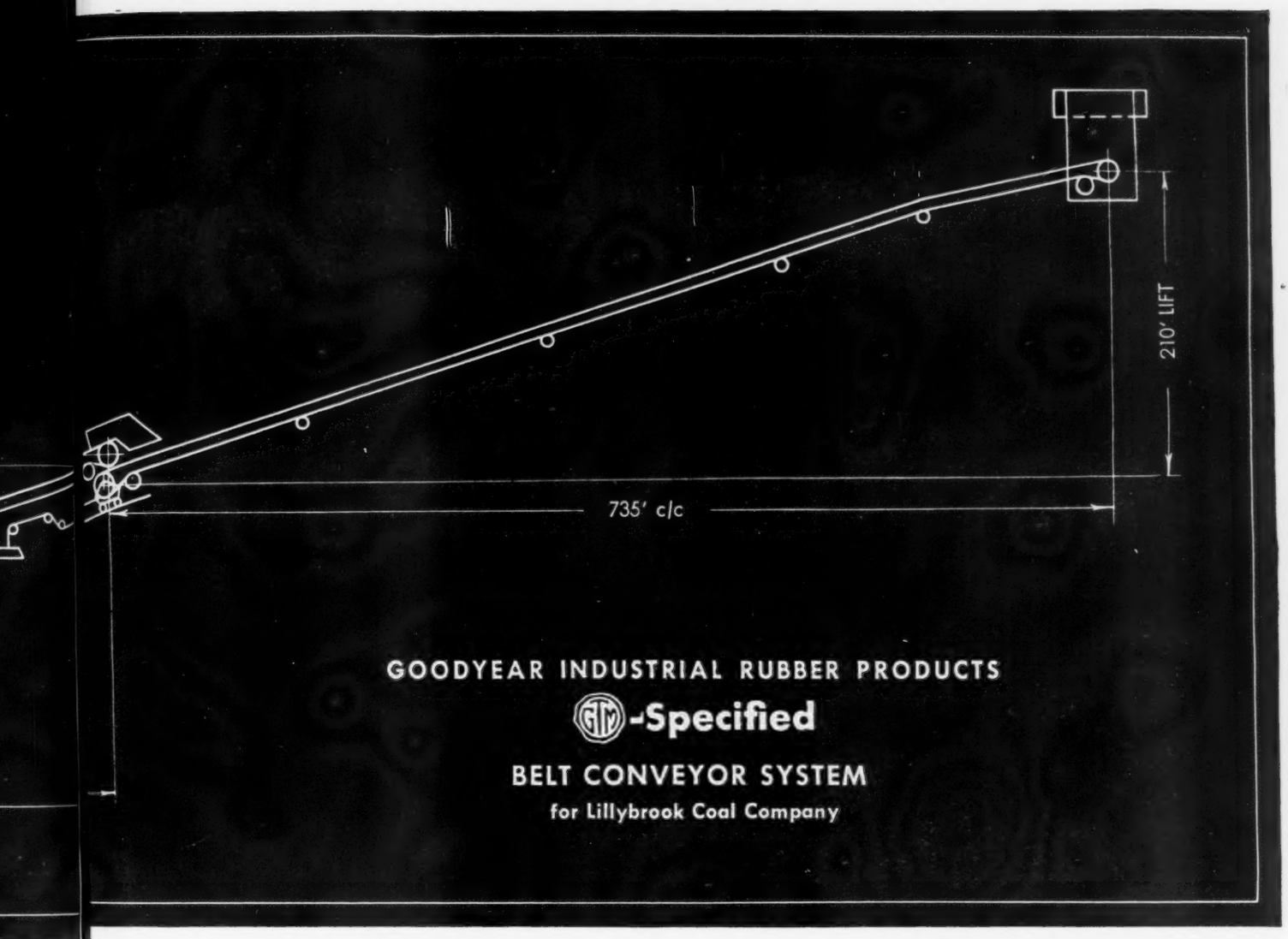
The seam was 428 feet below surface! Engineering considerations required sinking the slope at a 32 per cent incline! An output of 450 tons per hour was demanded!

To meet these conditions the G.T.M. – Goodyear Technical Man – specified a two-flight conveyor installation – the lower conveyor operating on 670-foot centers, the upper on 735-foot centers. To insure ample tonnage capacity, with good nesting for lumps to prevent rollbacks, he specified Goodyear belts, 42 inches wide, running at 350 feet per minute.

A 12,000,000-ton record

Now here's the pay-off. Today after nine years' operation, this veteran – *the longest and steepest installation in this field* – is still performing faultlessly, is still in A-1 condition. And it has delivered the required 450 tons at the tipple every working hour; a total of more than 12,000,000 tons!

If you want lowest-cost-per-ton haulage – reduced power costs – greater output – increased safety for personnel – investigate the many advantages



GOODYEAR INDUSTRIAL RUBBER PRODUCTS

GTM-Specified

BELT CONVEYOR SYSTEM

for Lillybrook Coal Company

of Goodyear conveyor belts, both for slope haulage and underground. Proof of their superiority and longer life is the fact that "*more tons are hauled on Goodyear conveyor belts than on any other kind!*"

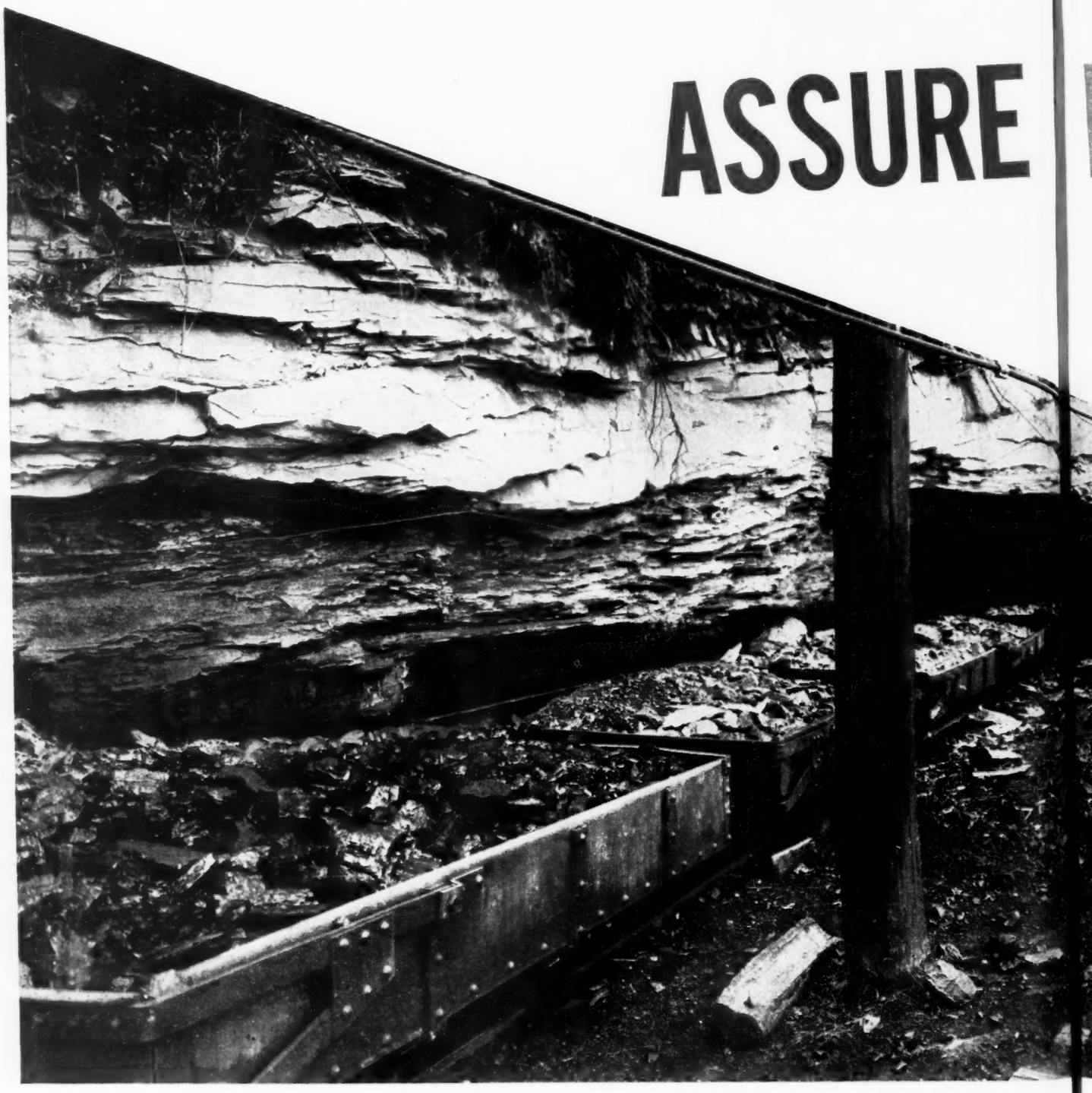
To bring the G.T.M. to your office for a complete analysis of your operation with dollar-and-cents' proof of savings, write: Goodyear, Akron 16, Ohio or Los Angeles 54, California.

* * *

FOR HOSE, BELTING, MOLDED GOODS, PACKING, TANK LINING built to the world's highest standard of quality, phone your nearest Goodyear Industrial Rubber Products Distributor.

GOODYEAR

THE GREATEST NAME IN RUBBER



Tune in . . .
TEXACO STAR THEATRE
presents the NEW
EDDIE BRACKEN SHOW
every Sunday night.
Metropolitan Opera
broadcast every
Saturday afternoon.

TEXACO
REG. T.M.

TEXACO LUBRICANTS

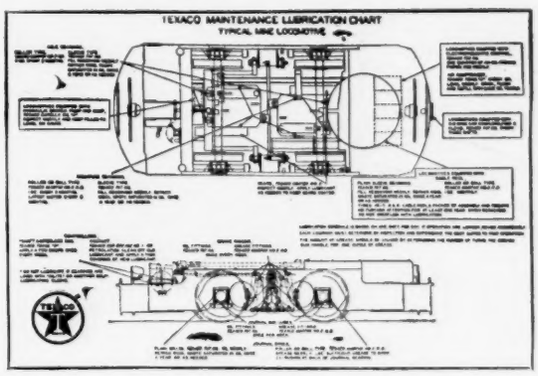
EASIER STARTS... HAUL LONGER TRAINS

EVEN when the temperature drops 'way down, *Texaco Olympian Grease* retains its effective lubricating qualities. Use it in plain, cavity hub or anti-friction car wheel bearings and you'll keep frictional drag at a minimum — assuring easier starts and more cars per train.

Texaco Olympian Grease is made especially for mine equipment and comes in three consistencies to meet all requirements. It resists separation and leakage . . . maintains its effectiveness in the presence of moisture, and over a wide temperature range . . . assures longer-lasting protection. It is very easy to apply.

You will find *Olympian Grease* an ideal lubricant for cutters, loaders and similar equipment as well as for car wheels. It gives the effective protection that means trouble-free operation and lower maintenance costs.

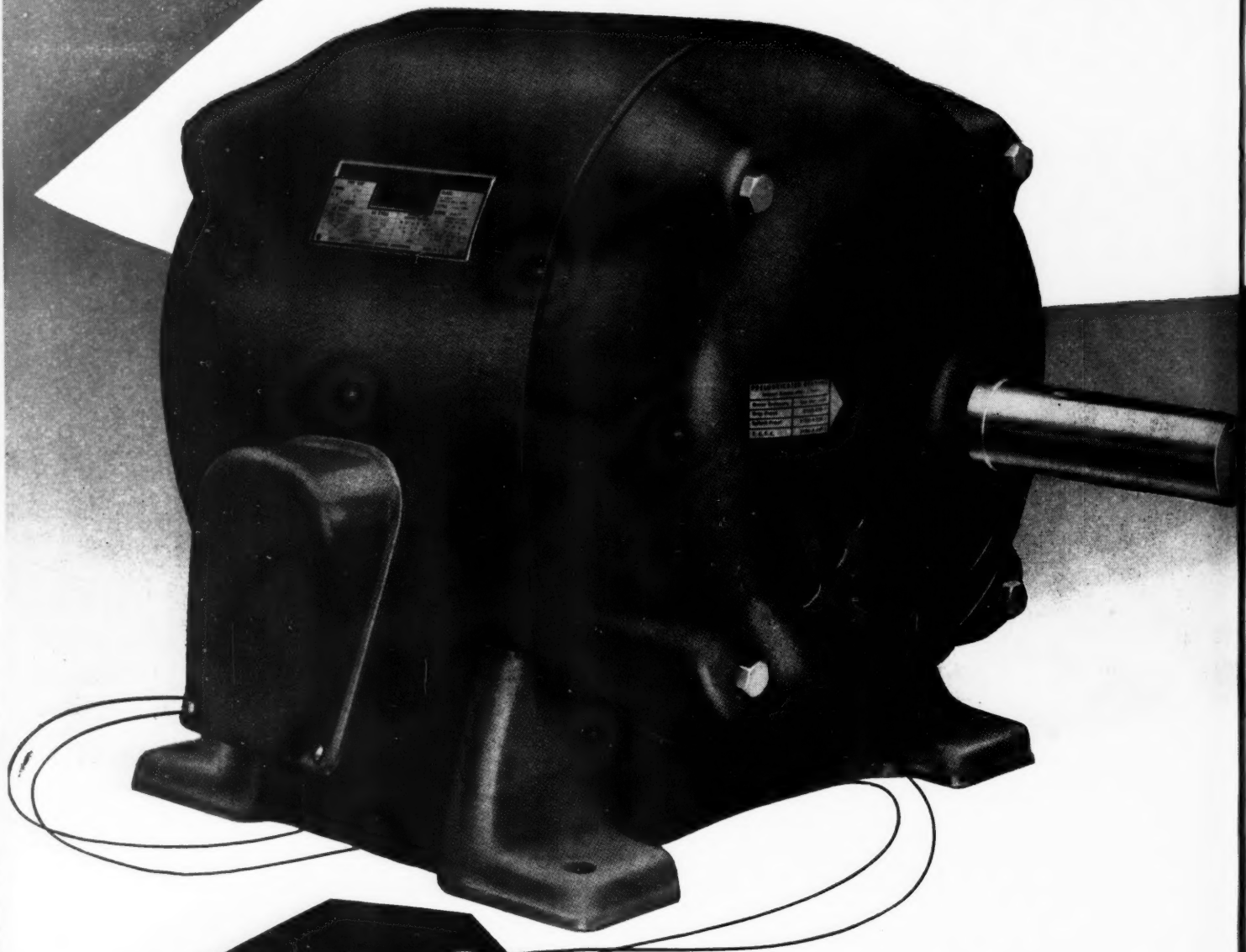
Get all the benefits of Texaco Products and Lubrication Engineering Service. Call the nearest of the more than 2300 Texaco distributing plants in the 48 States, or write The Texas Company, *National Sales Division, Dept. C,* 135 East 42nd Street, New York 17, N. Y.



TEXACO MAINTENANCE LUBRICATION CHARTS. Leading manufacturers of underground coal mining machinery approve Texaco products for use on cutters, loaders, locomotives, etc., and have cooperated in preparing these charts. Charts show clearly where and when to use the proper Texaco lubricants. Order the charts you need by make and model of each machine.

For the Coal Mining Industry

The most important advance in motor design in 58 YEARS... t



When Westinghouse engineers began designing a postwar motor they abandoned the concept that all motors must be cousins. Instead, they asked electric motor users *what they wanted* in motors . . . features they couldn't buy in any one motor.

These features demanded most by motor users are *all* incorporated in the new Life-Line Motors:

ALL-STEEL PROTECTION. All frames, feet and brackets are HEAVY STEEL. Life-Line Motor stators are far stronger—a new core locking device eliminates rivets.

Westinghouse

PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE

...the New WESTINGHOUSE Life-Line MOTOR

It's completely new . . . it's completely different . . . it wraps up the advances made in "custom-built" wartime motors in a single package!

For 58 years, induction motors have been built fundamentally alike. Differences have been minor . . . improvements gradual. Today, in the new Life-Line, Westinghouse presents a major departure from accepted ideas of standard-motor limitations.

Life-Line, today, offers industry a truly all-steel protected motor. All exposed surfaces are HEAVY STEEL—frames of even the smallest sizes are 3/8" thick.

More compact power is packed in Life-Line. For example, on the 284 frame, size has been reduced 35%, although NEMA mounting dimensions have been maintained . . . starting torques are as much as 134% greater per pound of motor . . . maximum torques as much as 116% more per pound.

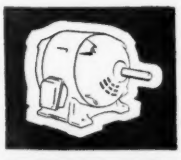
Electrical characteristics have been improved . . . new materials and new winding techniques give increased protection against electrical failure. And sealed, pre-lubricated bearings do away with need for greasing or attention for at least five years!

The Life-Line Motor, as a result, represents the biggest single step forward in design and construction since the invention of the electric motor 58 years ago. Life-Line Motors are now reaching the drives of industry by the thousands, but are not yet available in quantities to meet the unprecedented demand. So, look over Life-Line advantages now with an eye to your future requirements. Your local Westinghouse office can give you full details, or write to Westinghouse Electric Corporation, P. O. Box 2025, Buffalo 5, N. Y.

★ ★ ★

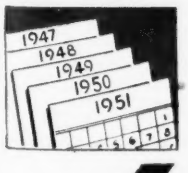
Life-Line Motors are now in production at the new Westinghouse Motor Works in Buffalo, N. Y. This plant is laid out, tooled and equipped to fully utilize newly developed production processes and techniques on a scale hitherto unequalled in the manufacture of electrical motors.

J-21406

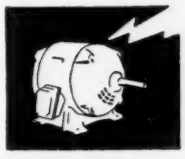


LESS SPACE PER HP. Life-Line Motors occupy less space per horsepower than any other standard motor . . . making it easier to build into machines and install in cramped quarters.

MORE TORQUE PER LB. Life-Line Motors give as much as 134% higher starting torque per pound of motor . . . up to 116% higher maximum torque.



NO LUBRICATION FOR 5 YEARS. Life-Line Motors need no greasing for AT LEAST FIVE YEARS. Bearings are pre-lubricated . . . sealed against dirt and moisture.



IMPROVED WINDINGS. New insulating materials . . . new coil winding techniques . . . new stator slot designs . . . give the Life-Line new record-setting protection against electrical failures.

NEW QUIET SMOOTHNESS. Life-Line Motors cut vibration and noise to new low limits for standard motors . . . satisfy many "special motor" requirements.

NEW SLEEK LINES. The Life-Line has sleek lines . . . a smooth finish . . . discourages dust and dirt accumulations . . . harmonizes with modern machine and tool design.

Life-Line motors

The most important advance in motor design in 58 YEARS... t

When Westinghouse engineers began designing a postwar motor they abandoned the concept that all motors must be cousins. Instead, they asked electric motor users *what they wanted* in motors . . . features they couldn't buy in any one motor.

These features demanded most by motor users are *all* incorporated in the new Life-Line Motors:

ALL-STEEL PROTECTION. All frames, feet and brackets are HEAVY STEEL. Life-Line Motor stators are far stronger—a new core locking device eliminates rivets.

Westinghouse

PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE

... the New WESTINGHOUSE Life-Line MOTOR

It's completely new . . . it's completely different . . . it wraps up the advances made in "custom-built" wartime motors in a single package!

For 58 years, induction motors have been built fundamentally alike. Differences have been minor . . . improvements gradual. Today, in the new Life-Line, Westinghouse presents a major departure from accepted ideas of standard-motor limitations.

Life-Line, today, offers industry a truly all-steel protected motor. All exposed surfaces are HEAVY STEEL—frames of even the smallest sizes are 3/8" thick.

More compact power is packed in Life-Line. For example, on the 284 frame, size has been reduced 35%, although NEMA mounting dimensions have been maintained . . . starting torques are as much as 134% greater per pound of motor . . . maximum torques as much as 116% more per pound.

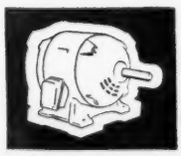
Electrical characteristics have been improved . . . new materials and new winding techniques give increased protection against electrical failure. And sealed, pre-lubricated bearings do away with need for greasing or attention for at least five years!

The Life-Line Motor, as a result, represents the biggest single step forward in design and construction since the invention of the electric motor 58 years ago. Life-Line Motors are now reaching the drives of industry by the thousands, but are not yet available in quantities to meet the unprecedented demand. So, look over Life-Line advantages now with an eye to your future requirements. Your local Westinghouse office can give you full details, or write to Westinghouse Electric Corporation, P. O. Box 2025, Buffalo 5, N. Y.

★ ★ ★

Life-Line Motors are now in production at the new Westinghouse Motor Works in Buffalo, N. Y. This plant is laid out, tooled and equipped to fully utilize newly developed production processes and techniques on a scale hitherto unequalled in the manufacture of electrical motors.

J-21406



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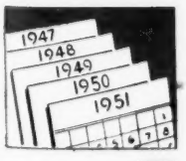

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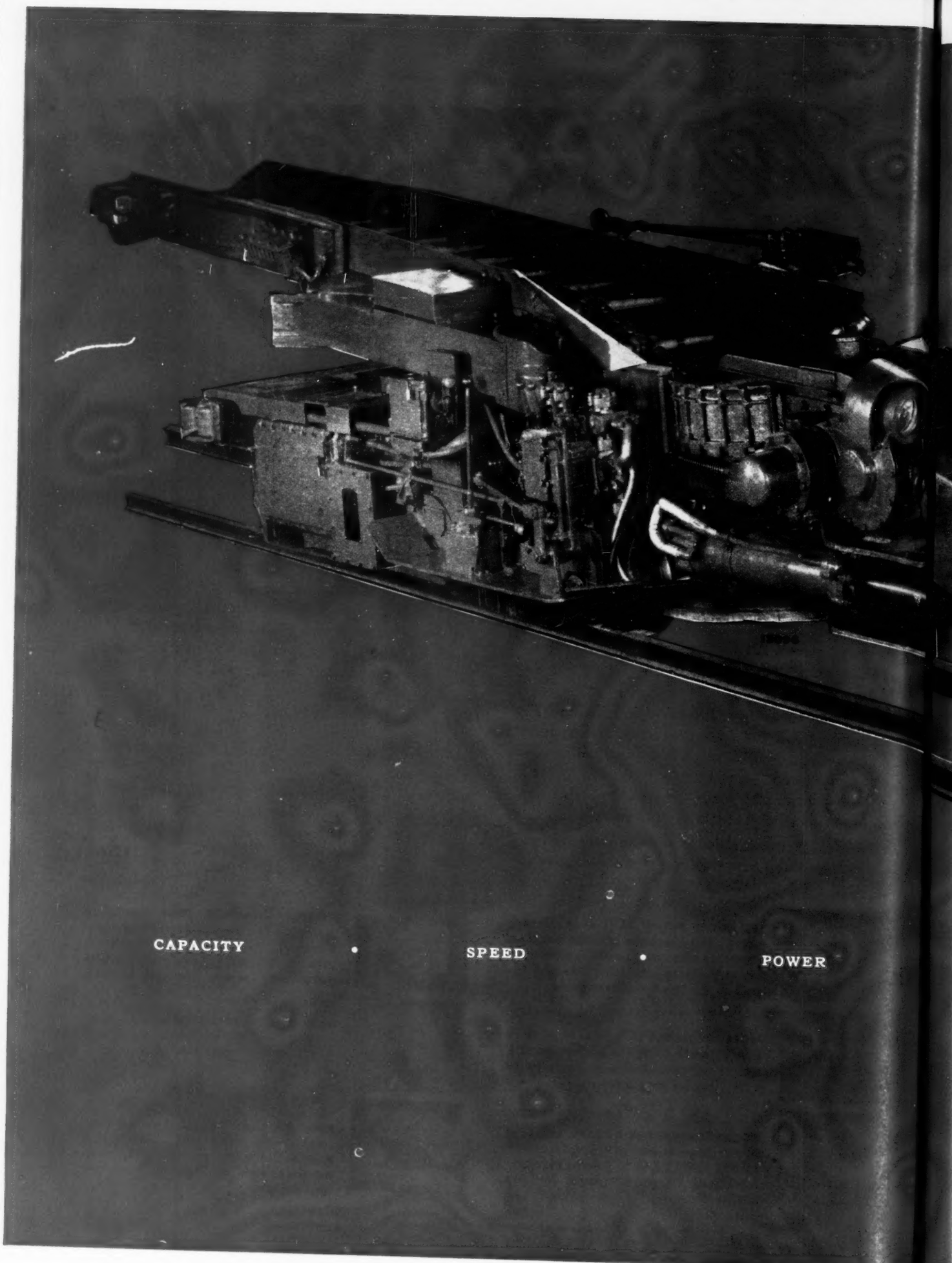
Life-Line motors



CAPACITY • SPEED • POWER

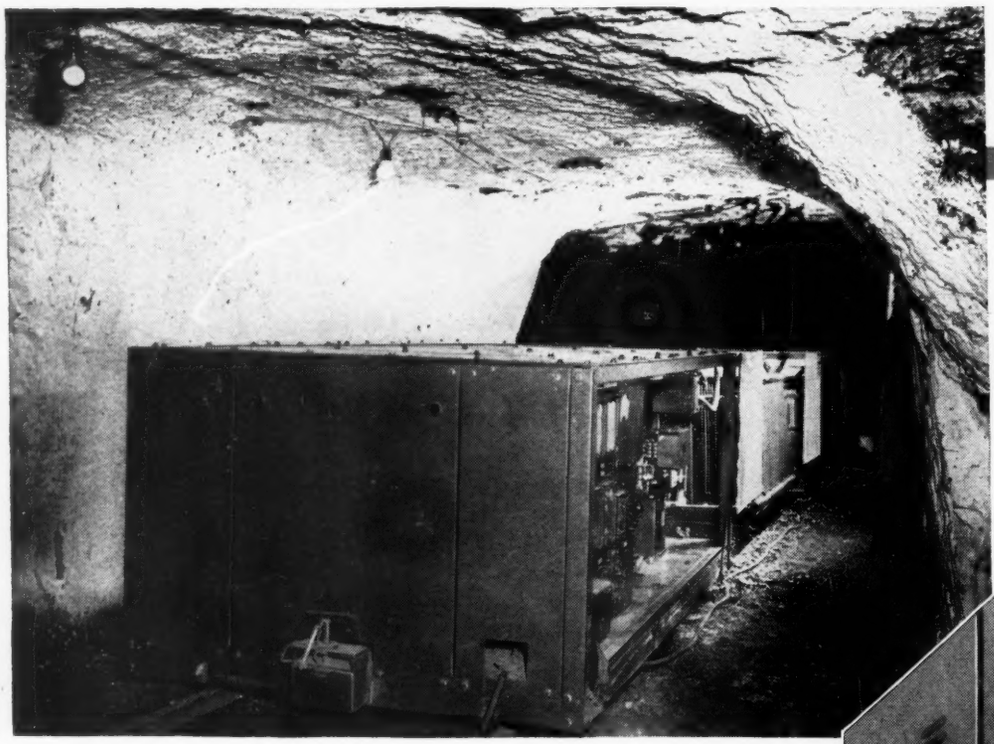
GOODMAN LOADERS

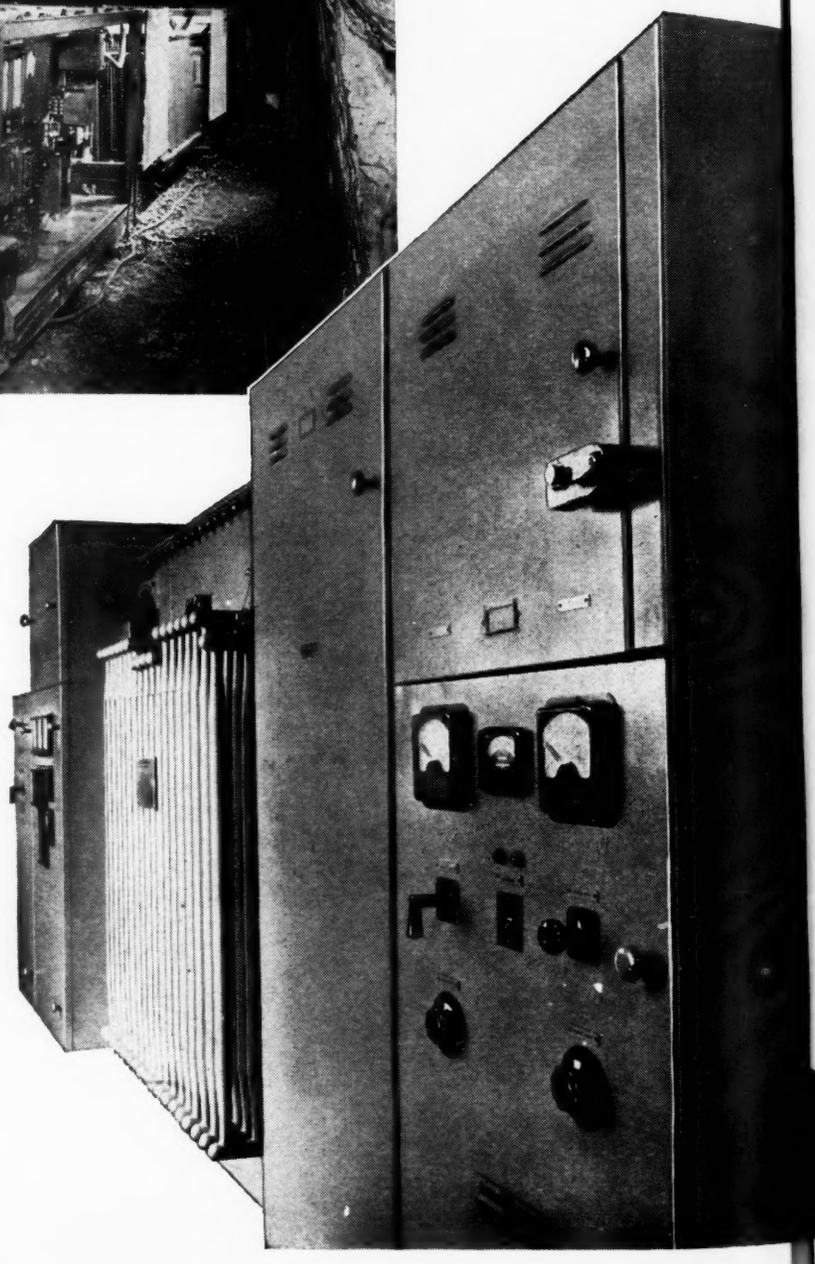
MAXIMUM CLEAN-UP • EASE OF CONTROL • LOW MAINTENANCE

GOODMAN MANUFACTURING COMPANY

CHICAGO 9, ILLINOIS

RECTIFIER CUTS





G-E PORTABLE MERCURY-ARC RECTIFIERS

. . . in addition to the basic efficiencies of mercury-arc equipment, provide these worthwhile advantages for underground applications:

1. Enclosed for greater personnel safety
2. Highly portable for movement close to the working face
3. Low-slung design for use in cramped areas
4. Dead-front panels to keep out dust and dirt
5. Wide range of available ratings

G-E STATIONARY MERCURY-ARC RECTIFIERS

. . . are well suited for use in preparation plants, ore mills, surface substations, and similar applications. Important features are:

1. High conversion efficiency in all ratings
2. Low maintenance costs
3. Long, continuous service
4. Quiet operation
5. Wide range of available ratings

POWER COSTS 31%

. . . IN THIS PENNSYLVANIA MINE!

Cost per ton shows substantial decrease following installation of high efficiency G-E Mercury Arc Rectifier

In the middle of January, 1946, a General Electric sealed-ignitron mercury-arc rectifier was installed at the McCombie mine in central Pennsylvania. Within six weeks, cost records proved the ability of a mercury-arc rectifier to cut power costs. Here are the facts:

MONTH	PRODUCTION	POWER COST PER TON
December, 1945 (old method)	5395 tons	$.097
January, 1946 (first half-old method) (second half-rectifier)	6126 tons	$.078
February, 1946 (rectifier)	6470 tons	$.067

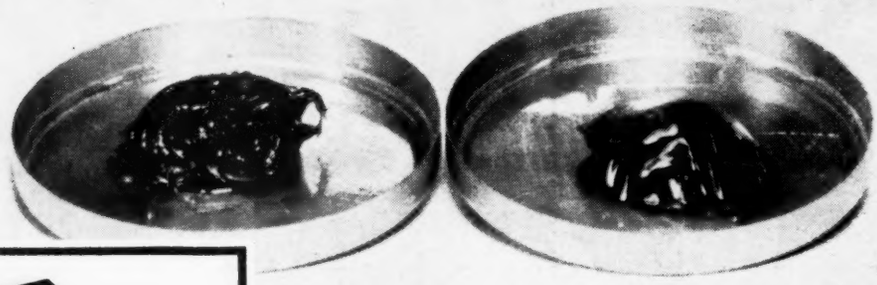
In other words, power rectification has been directly responsible for a cut of $.03 per ton in power costs—a 31% reduction. Thanks to the inherent efficiency of a General Electric mercury-arc rectifier at all loads, and its ability to supply ample power when required, these power savings were achieved. Moreover, the rectifier's overload capacity makes possible power continuity at a steady level during the high peak periods in the mining power load.

Regardless of the size of your mining operation, improved conversion methods may result in reduced power costs. And a General Electric rectifier may be the solution. Why not find out now? Call or write your nearest G-E office today. *Apparatus Department, General Electric Company, Schenectady 5, N. Y.*

MERCURY-ARC *Rectifiers*

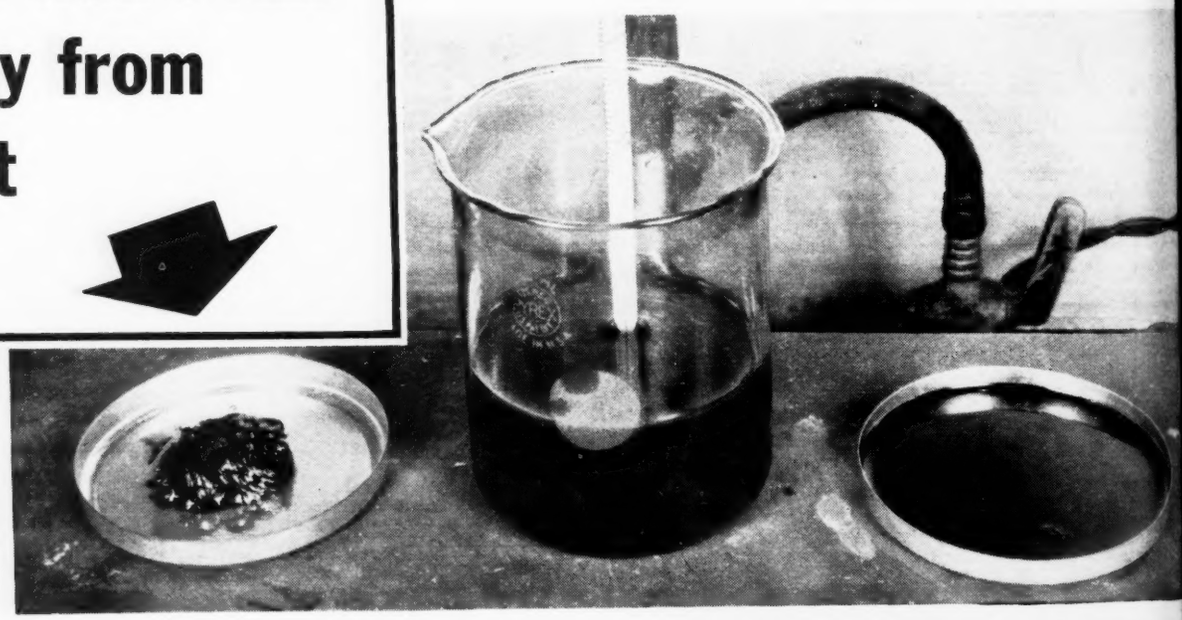
GENERAL ELECTRIC

657-67-148



A gear lubricant that won't run away from heat

(Above) Two samples of grease, Calumet Viscous Lubricant on left and a residuum type gear shield, right. These samples are placed on a hot plate (below) and heated to 320°F. as determined by the thermometer in the beaker of oil. Within 60 seconds the old type gear shield has melted and spread over the pan. There is little or no change in structure of Calumet Viscous Lubricant even at this high temperature.



THE SIMPLE TEST described here shows why Calumet Viscous Lubricants are unusually effective for lubricating mine equipment such as, wire rope, shovel and hoist gears. It reduces throwoff, cuts lubricant consumption and protects open gears for long periods of time even though subjected to elevated temperatures. It penetrates and protects wire rope against internal and external wear.

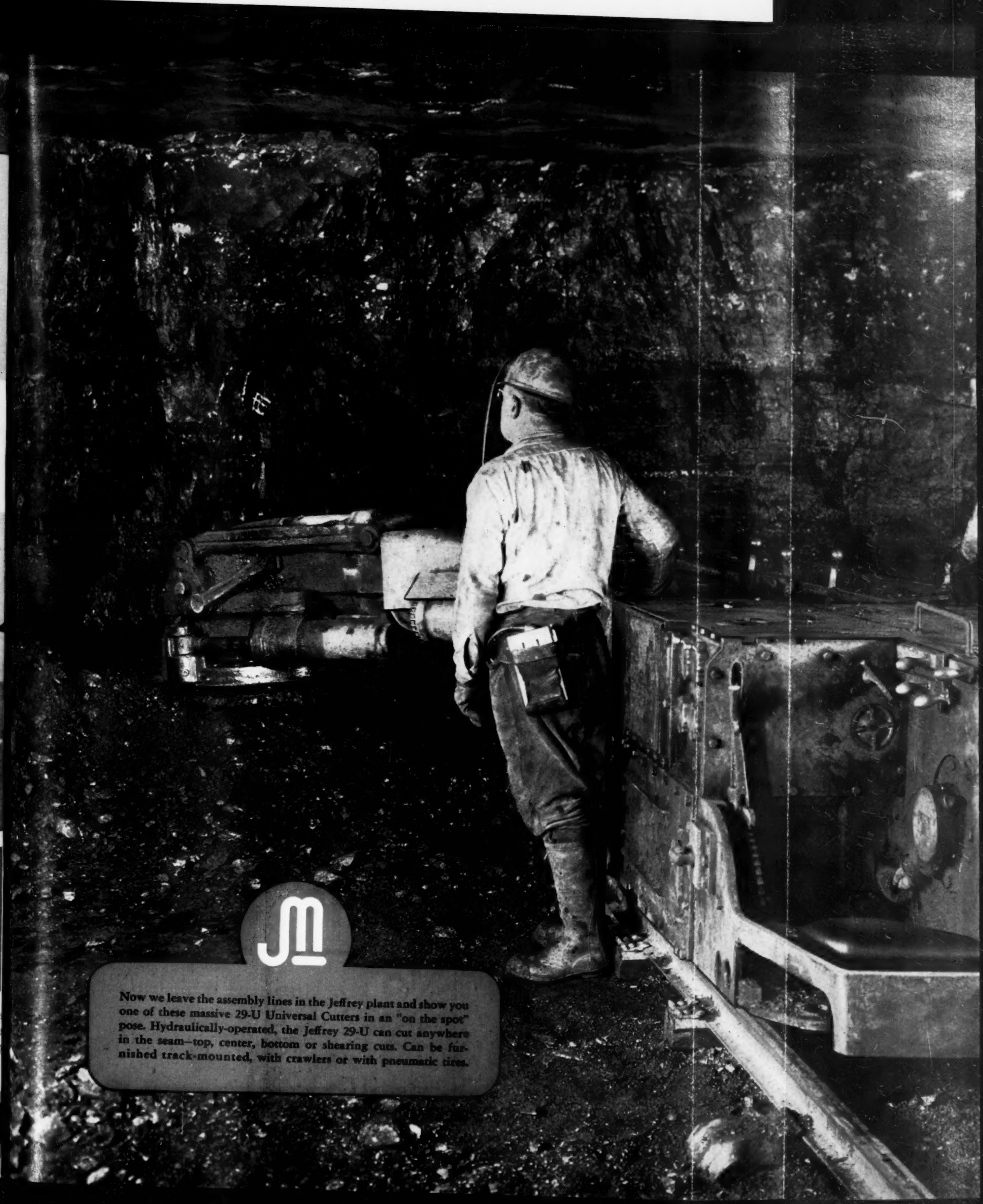
Calumet Viscous Lubricants have these qualities because they are not the old type gear shields but are true greases made from selected soaps and oils of proper viscosities. They do not require heating before application, and all but the heaviest grades can be sprayed. Both features offer a further saving in time and grease.

CALUMET Viscous Lubricants

A Standard Oil Lubrication Engineer will help you s lect the grade you need for low cost open gear lubricati

Standard Oil Company (Indiana), 910 South Michig Avenue, Chicago 80, Illinois.

STANDARD OIL COMPANY (INDIANA) STANDARD SERVICE



Now we leave the assembly lines in the Jeffrey plant and show you one of these massive 29-U Universal Cutters in an "on the spot" pose. Hydraulically-operated, the Jeffrey 29-U can cut anywhere in the seam—top, center, bottom or shearing cuts. Can be furnished track-mounted, with crawlers or with pneumatic tires.

602-44

Close-up of Jeffrey 29-U Cutter assembly operation. These employees take pride in precision manufacture . . . get a heap of satisfaction out of a job "well done"

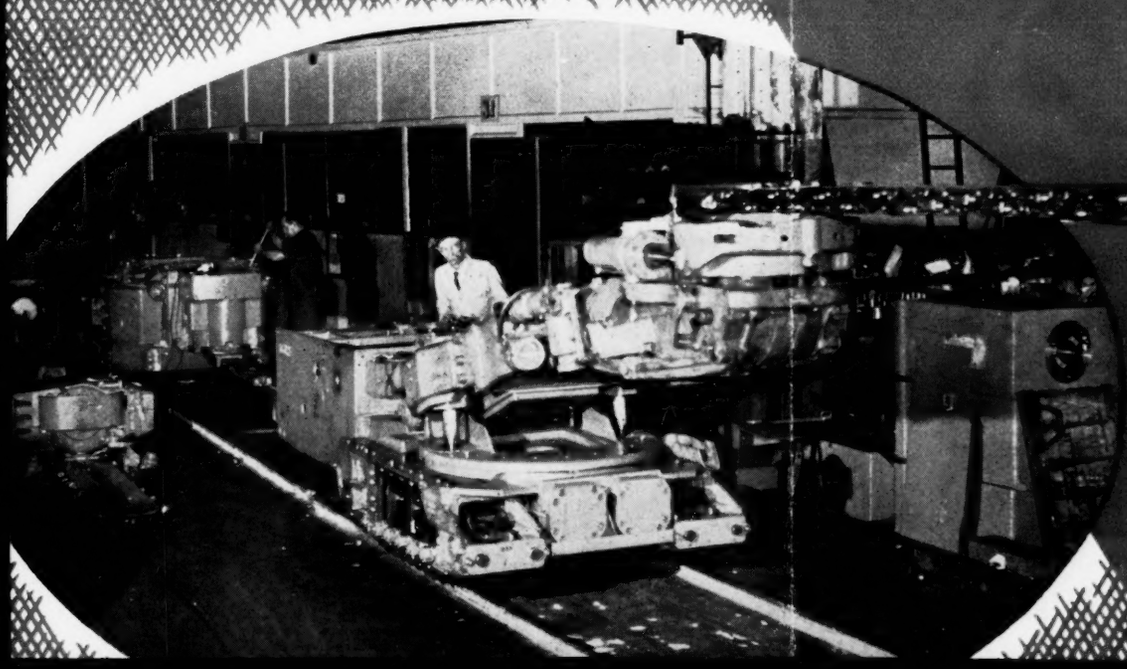
Assembling Jeffrey 29-U Cutting Machines

Patented

To a large degree skill is the result of long experience. The men shown assembling Jeffrey 29-U Universal Coal Cutters have specialized on this particular equipment for years. They know it like a watchmaker knows a watch.

Although they may never have the opportunity of seeing the machines they build in actual operation, they know from past performance records that rigidity, strength and careful workmanship pays off in long satisfactory service.

We at Jeffrey wish to give credit to these men responsible for the building of this efficient equipment and know that operators using our Cutters, Loaders, Locomotives, drills, Underground Conveyors, Fans and Tipple Equipment appreciate the high quality attained by Jeffrey trained men.



Before this big Jeffrey 29-U Cutter (with crawler mounting) is shipped it is given every possible test in the shop. Photo shows a Jeffrey employee putting the machine through its paces.

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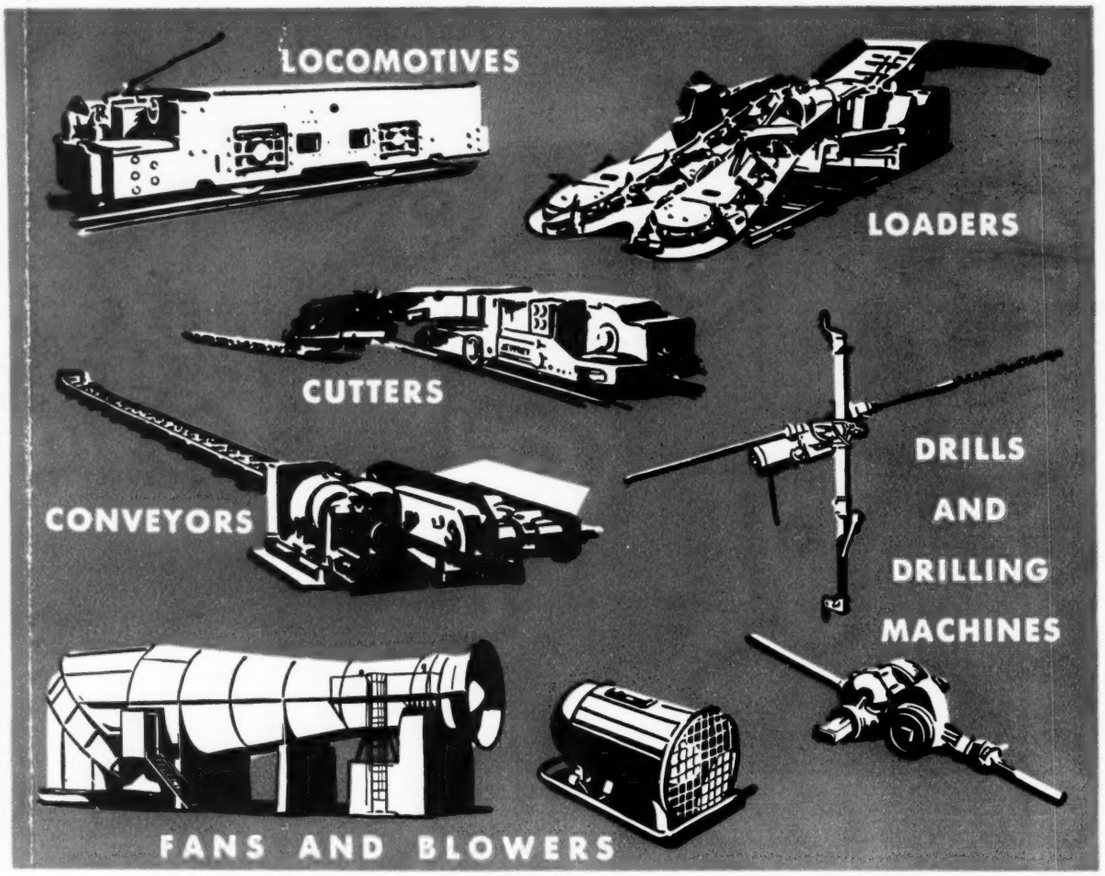
Before this big Jeffrey 29-U Cutter (with crawler mounting) is shipped it is given every possible test in the shop. Photo shows a Jeffrey employee putting the machine through its paces.

Jeffrey

EQUIPMENT FOR COAL MINES

JEFFREY SERVICE TO THE COAL MINES MEANS SERVICE TO ALL INDUSTRY



THE JEFFREY MANUFACTURING COMPANY

Established in 1877

912-99 NORTH FOURTH STREET, COLUMBUS 16, OHIO

Sales Offices:	Baltimore Birmingham Boston Buffalo	Chicago Cleveland Cincinnati Detroit	Denver Harlan Houston Huntington	Milwaukee New York Philadelphia Pittsburgh	Scranton St. Louis Salt Lake City
Service Stations:	Pittsburgh Harlan, Ky.	Birmingham St. Louis	Logan-Beckley W. Va.	Scranton	
Foreign Plants:	Jeffrey Mfg. Co., Ltd. Montreal, Quebec	British Jeffrey-Diamond, Ltd. Wakefield, England	Jeffrey-Galion (Pty), Ltd. Johannesburg, S. A.		

Split-Second Timing gets results . . .

ATLAS ROCKMASTER BLASTING has a scoring punch

In modern basketball winning scores are the result of teamwork based upon split-second timing. In modern blasting, too, an amazing control of timing is producing outstanding results for blasters all over the country.

Now the blaster is able to time the delay elements of his shot in thousandths of a second . . . a feat never before possible . . . and fragmentation has increased tremendously. While still under the strain of the first blast, the rock is hit again . . . a split-second later . . . with terrific impact. The results are astounding.

In dollars and cents, Atlas Rockmaster means money saved. Reports coming in from one blasting operation after another continue to tell of fragmentation increased as much as 30% . . . shovel efficiency stepped-up . . . secondary shooting cut down . . . and complaints due to noise and vibration held to a minimum.

Of course, split-second timing is not the only factor in a Rockmaster blast. For Atlas Rockmaster is a complete blasting system . . . not just a timing device. All factors of the blasting problem — detonators, explosive and loading — are taken into account and combined with your know-how and ours to produce true Rockmaster effectiveness.

To find out how Rockmaster can be made to work for you with outstanding results . . . call in your Atlas representative.

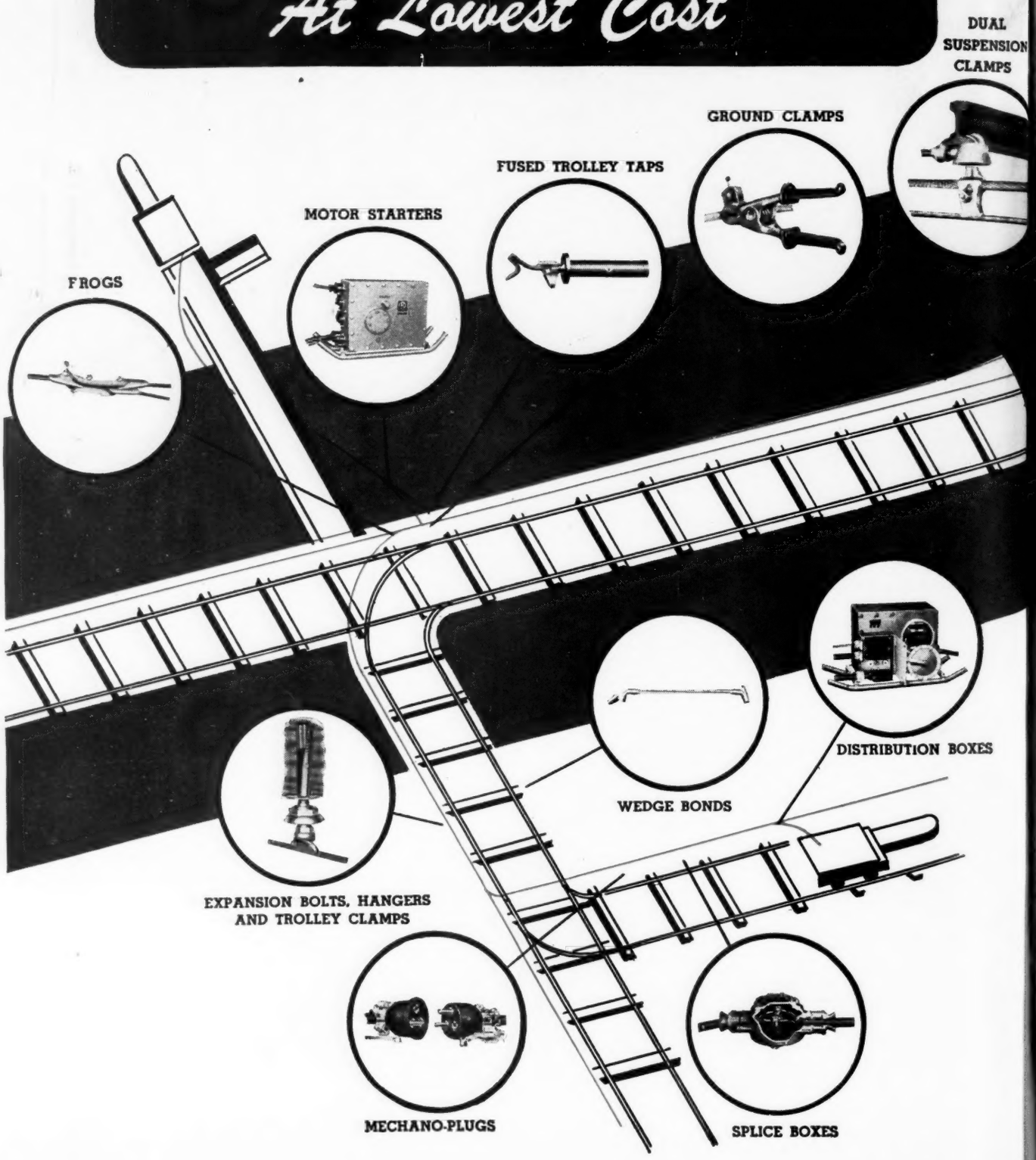
Manasite: Reg. U. S. Pat. Off. "ROCKMASTER"—Trade Mark

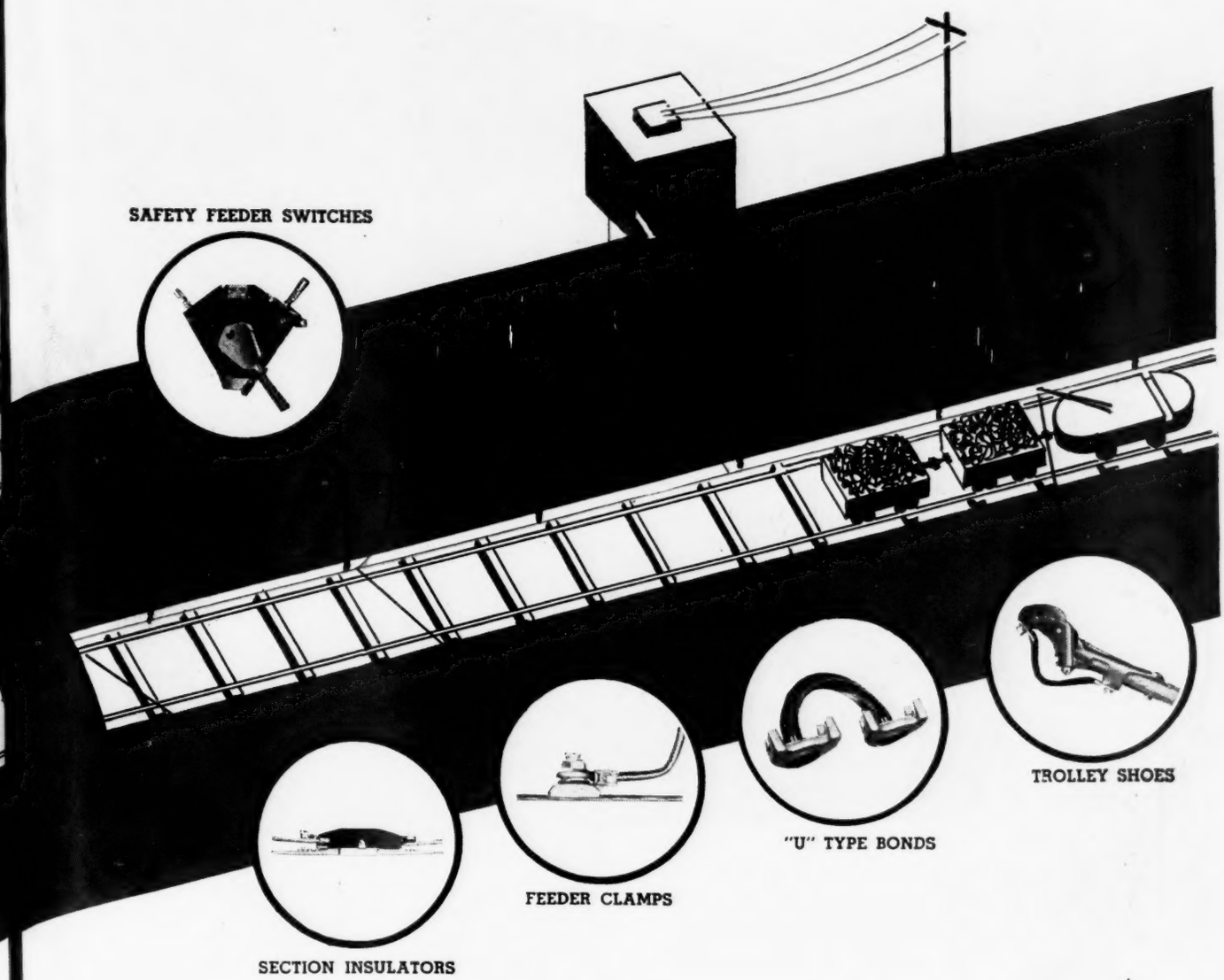
ATLAS EXPLOSIVES *"Everything for Blasting"*

CHEMICALS ATLAS EXPLOSIVES

ATLAS POWDER COMPANY, Wilmington 99, Del. • *Offices in principal cities* • *Cable Address—Atpowco*

PUT *Controlled Power* WHERE YOU NEED IT WHEN YOU NEED IT *At Lowest Cost*





WHETHER your power distribution system embraces but a few miles of trolley and feeder or a complex arrangement of interlocked control for mechanical equipment, you can be certain of reliable, low-cost service by installing O-B power handling materials from substation to face. Designed to work together, O-B materials combine to produce a system that really *works*--a system not subject to power outages from product failures--a system that assures an adequate flow of controlled power when and where you need it. O-B's complete "substation-to-face" line of power distribution materials includes a wide variety of devices, each carefully designed and expertly manufactured for years of trouble-free service. Many of the individual products are shown here. For a more complete selection, consult your No. 22 catalog.

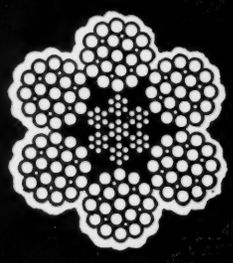
Ohio Brass

MANSFIELD, OHIO

CANADIAN OHIO BRASS CO., LTD., NIAGARA FALLS, ONT.

2787-M

Best for Heavy Hoisting



UPSON-WALTON
6 x 19 FILLER WIRE CABLE

FOR boom falls on shovels and draglines, for operating ropes on vertical lift bridges, for pan hoist and counterweight ropes on car dumpers—industry after industry has heavy hoisting conditions which are best served by Upson-Walton 6 x 19 Filler Wire Perfection Layrite.

Perfection grade because this improved plow steel is the strongest and toughest and most resistant to wear of all the grades of wire used to make rope.

Layrite because this fine *pre*formed wire rope results in longer life, greater safety, greater economy.

Hemp center or, where hoisting conditions are extremely severe, IWRC (independent wire rope center)

Upson-Walton, 6 x 19 Filler Wire is the wire rope which provides a fine balance between coarser ropes, which have good abrasion resistance but poor flexibility, and flexible ropes with less abrasion resistance. *Upson-Walton 6 x 19 Filler Wire cable combines good flexibility with good abrasion resistance.*

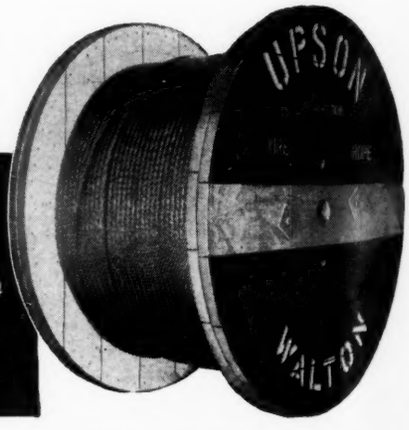
The filler wires support uniform outer wires, thereby giving the rope a greater resistance to crushing and other damage where radial pressures and operating conditions are severe. This construction provides a high percentage of reserve or internal strength.

U-W

Established 1871

It will pay you to specify (and supply) Upson-Walton 6 x 19 Filler Wire cable—perfection grade—Layrite preformed—for heavy hoisting duty.

Copyright 1946—The Upson-Walton Company



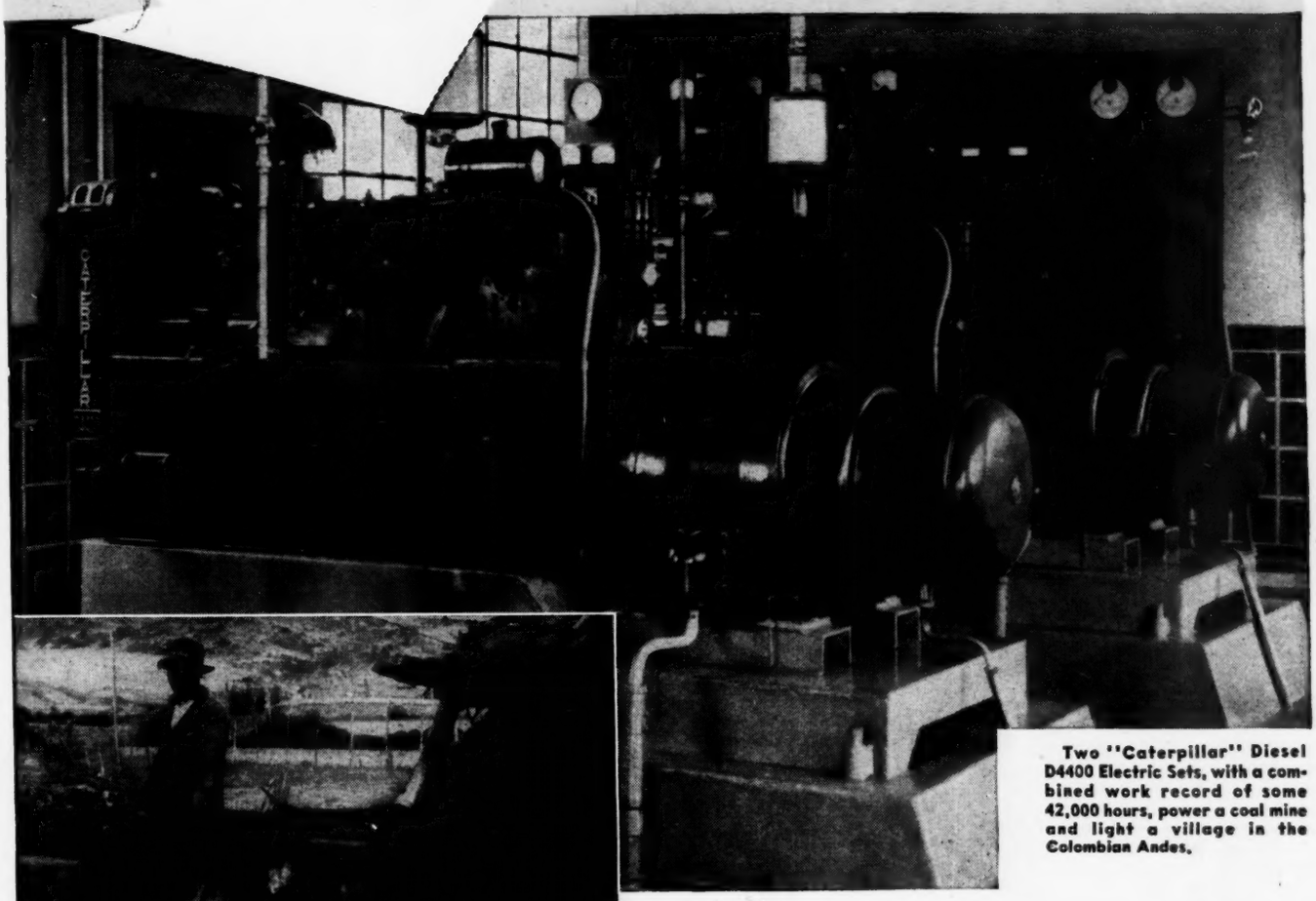
THE UPSON-WALTON COMPANY

Manufacturers of Wire Rope, Wire Rope Fittings, Tackle Blocks

MAIN OFFICES AND FACTORY: CLEVELAND 13, OHIO

114 Broad Street, New York 4 · 737 West Jackson Boulevard, Chicago 6 · 241 Oliver Building, Pittsburgh 22

DIESEL MINE POWER IN THE ANDES



Two "Caterpillar" Diesel D4400 Electric Sets, with a combined work record of some 42,000 hours, power a coal mine and light a village in the Colombian Andes.

"Caterpillar" Diesels generate low-cost power to pull loaded cars up from the mine by an electric hoist.

CATERPILLAR

REG. U.S. PAT. OFF.

DIESEL

ENGINES
TRACTORS
MOTOR GRADERS
EARTHMOVING EQUIPMENT

Up in the Andes Mountains, more than 30 miles from any power-line, a successful coal mine operates on current generated by a pair of "Caterpillar" Diesel D4400 Electric Sets.

"Carbonera San Vicente" is the largest coal-mine hacienda in Colombia. Since 1940 the two "Caterpillar" Diesels have not only supplied all power for the electric hoist, mine pumps and a fully equipped machine shop, but have lighted the nearby village of Sesquile, as well. Work records of the two engines show that one has operated 24,000 hours and the other 18,000.

The owners previously used a steam generating plant, burning coal from the mine. They estimate that these dependable "Caterpillar" Diesels have cut power-costs by more than 60 per cent.

Soon the generating capacity of the mine is to be increased, so that more labor-saving electric machinery can be installed. The new power will come from two "Caterpillar" Diesel D8800s, now on order. It is an axiom of "Caterpillar" dealers all over the world that a product is never *really sold* until customer satisfaction brings a *second* purchase.

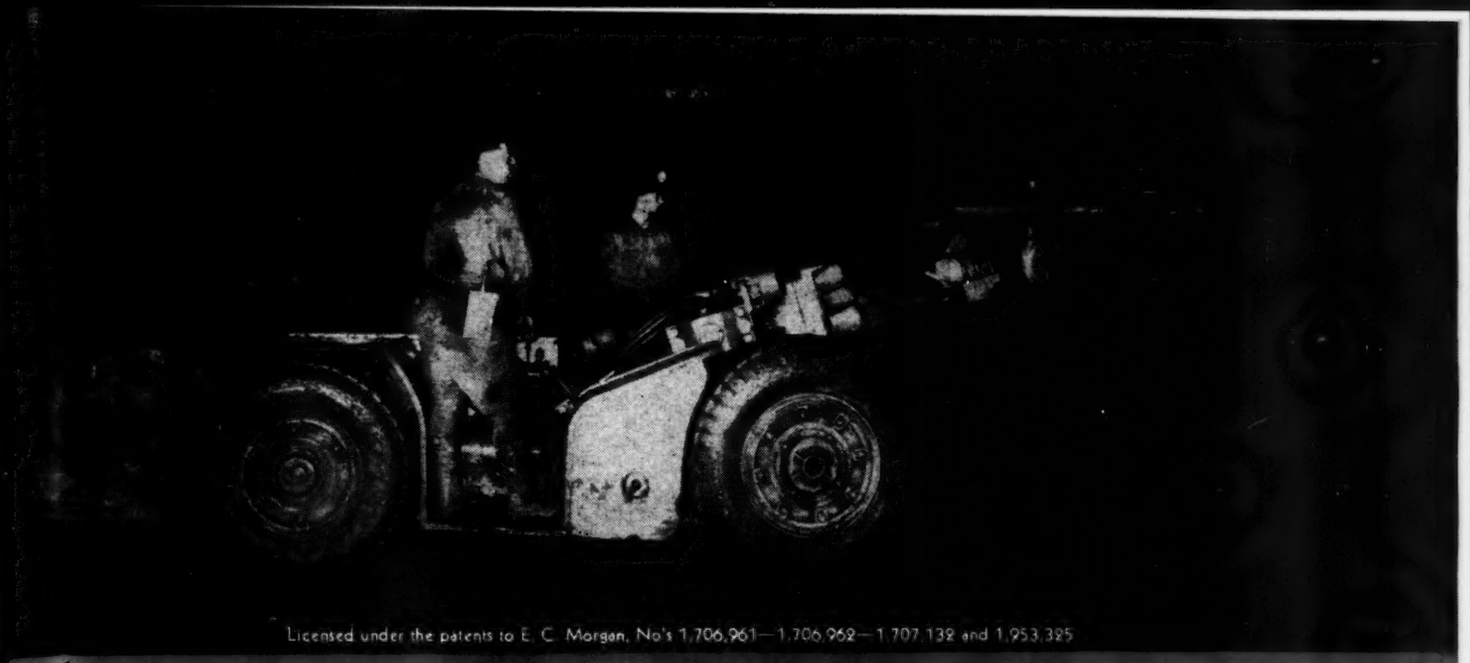
CATERPILLAR TRACTOR CO. • PEORIA, ILLINOIS

SULLIVAN COAL CUTTERS

HAVE A PROVED RECORD OF EFFICIENCY!

GOOD CUTTING MEANS LARGER LUMP AND FASTER PRODUCTION

Consult a Joy Engineer for "The World's Most Complete Line of Modern Mining Machinery"



Licensed under the patents to E. C. Morgan, No's 1,706,961—1,706,962—1,707,132 and 1,953,325

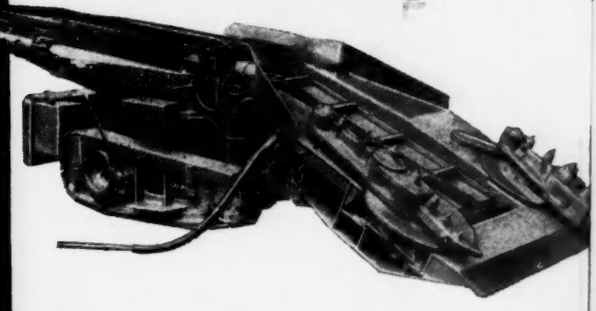
The Sullivan 10-BU Trackless Cutter above, trams faster; will top cut, middle cut, bottom cut and shear to produce more tons per man-hour, more coal per shift.

Licensed under the patents to E. C. Morgan. Nos. 1,706,961–1,706,962–1,707,132–1,953,325–1,953,326.

The Sullivan 7-B Shortwall below, has high cutting speed; short over-all length for work in close timbering; variable feed control; complete with lubrication and slow speed, heavy duty motor.

The Sullivan 7-AU is a fast and flexible universal track cutter. Cuts anywhere between roof and floor of seam, with 50% longer reach.

Joy Loaders, like this 11-BU, pair off with Sullivan cutters to speed production, set new records for mining economy in many mines throughout the nation.



SULLIVAN DIVISION

JOY MANUFACTURING COMPANY

GENERAL OFFICES: HENRY W. OLIVER BUILDING, PITTSBURGH, PENNSYLVANIA

W&D CL644

Easier way to better piping
...CRANE Supplies Everything

Why do it the hard way when you can simplify every step of piping jobs—from design to erection to maintenance work. Specify Crane equipment—the truly complete line that not only includes everything you need, but assures the quality you want in every item.

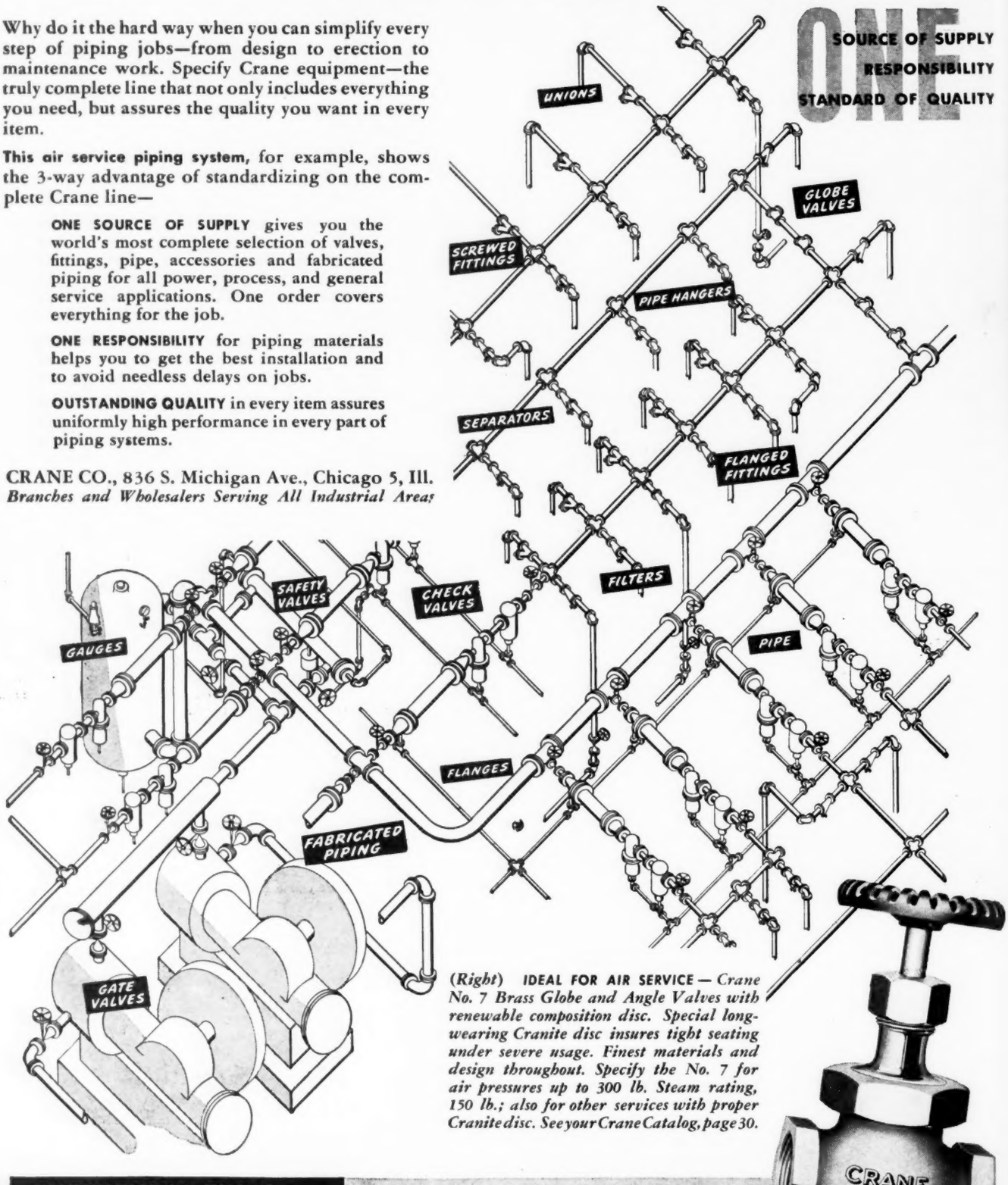
This air service piping system, for example, shows the 3-way advantage of standardizing on the complete Crane line—

ONE SOURCE OF SUPPLY gives you the world's most complete selection of valves, fittings, pipe, accessories and fabricated piping for all power, process, and general service applications. One order covers everything for the job.

ONE RESPONSIBILITY for piping materials helps you to get the best installation and to avoid needless delays on jobs.

OUTSTANDING QUALITY in every item assures uniformly high performance in every part of piping systems.

CRANE CO., 836 S. Michigan Ave., Chicago 5, Ill.
Branches and Wholesalers Serving All Industrial Areas



(Right) **IDEAL FOR AIR SERVICE**— *Crane No. 7 Brass Globe and Angle Valves with renewable composition disc. Special long-wearing Cranite disc insures tight seating under severe usage. Finest materials and design throughout. Specify the No. 7 for air pressures up to 300 lb. Steam rating, 150 lb.; also for other services with proper Cranite disc. See your Crane Catalog, page 30.*

EVERYTHING FROM . . .

VALVES • FITTINGS
PIPE • PLUMBING
HEATING • PUMPS

CRANE

FOR EVERY PIPING SYSTEM

2 TOURNAPULLS move 40 loads per hour on 200′ haul . . .

. . . Stripping Pennsylvania Coal Mine

To open coal deposit under 3 acres of Hunt Farm near Greensburg, Pa., Adam Eidemiller had to strip 30′ of clay, shale and soft oily waste coal . . . moved all of it fast and at low cost with his LeTourneau equipment.

400′ cycle every 3 minutes

On short 200′ hauls, 2 fast-moving, big rubber-tired Tournapulls delivered 40 loads of moist clay and topsoil an hour. That's an average round trip of load, haul, spread and return every 3 minutes for each rig.

LeTourneau user over 20 years

Eidemiller, a veteran LeTourneau equipment user for over 20 years, used these same Tournapulls on stripping operations near New Dairy, Pa., then drove them to this job near Greensburg.

Your LeTourneau Distributor has facts and figures proving Tournapulls lowest-net-cost-per-yard for stripping in small mines, benching down deep overburden, mine drainage, road construction, surfacing, etc. He can show you how they will save money and make money for you.

Tournapull — Trade Mark Reg. U. S. Pat. Off. CM10x

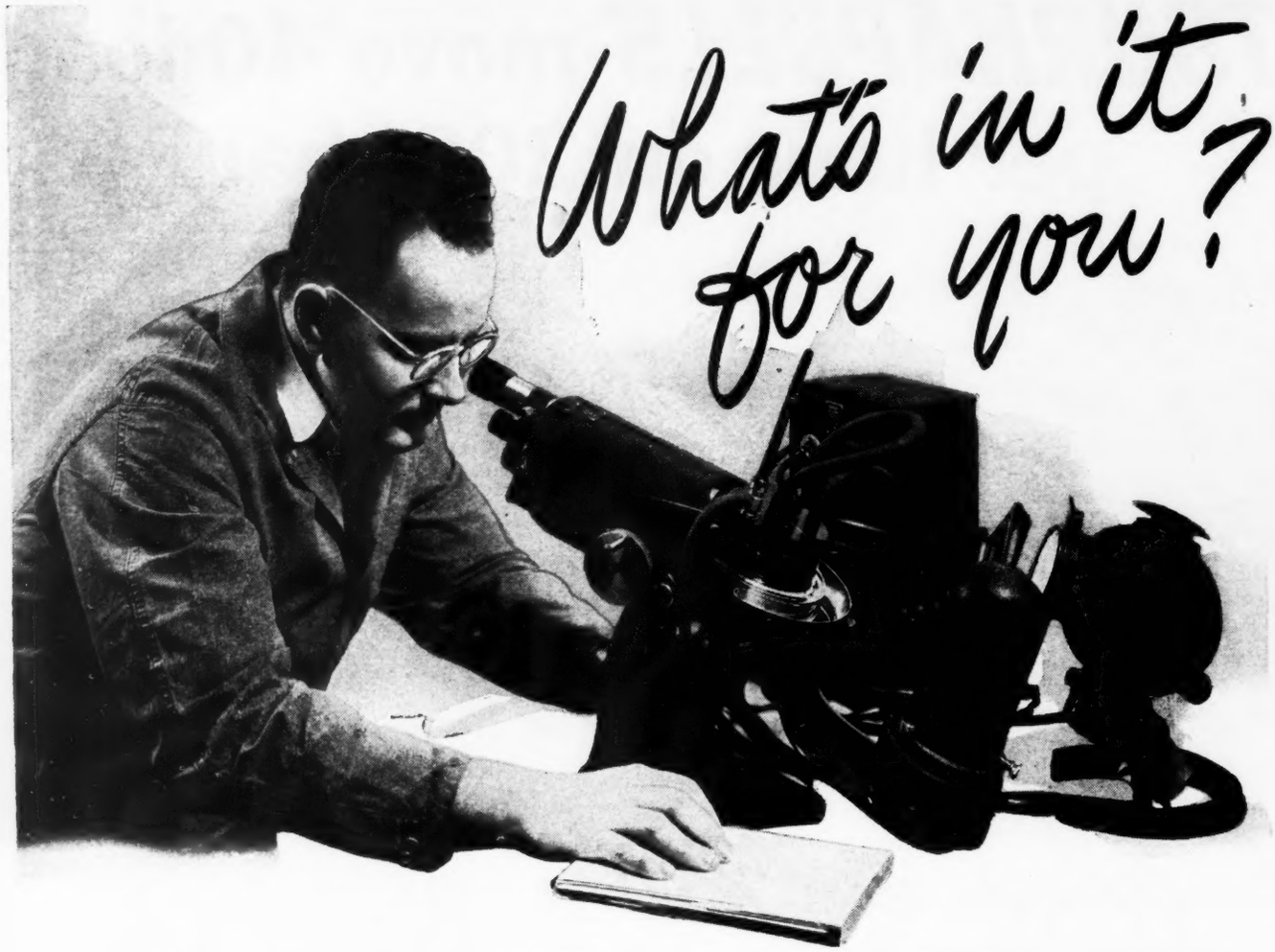
Opening up new mine is easy with Tournapulls . . . no box cut problems

Big rubber-tired Tournapulls haul easily over natural ground surface.

Overburden is spoiled on short haul just off the vein.

LETOURNEAU PEORIA ILLINOIS — JOB-PROVED Over 4200 Built and Shipped — **TOURNAPULLS**

FOR LOWEST NET COST PER YARD



In this special machine there's plenty for you as a user of industrial lubricants. With the modern Refractometer, Sinclair Laboratory specialists keep posted on what's in your industrial lubricants. It shows them what properties to strengthen, so the finished product will perform best in any specific application.

Index of refraction and specific dispersion, determined by the Refractometer, is a measure of the chemical structure of lubricating oils. By use of such instruments as the Refractometer, Sinclair maintains important control points in the manufacture of dozens of industrial lubricants.

Such laboratory research and control gives you assurance that Sinclair lubricants are made correctly to provide the kind of special protection your valuable machinery requires.

Sinclair Lubricants for Above-Ground Equipment

For Turbines:
SINTURLITE OILS
For Steam Cylinders:
SINCLAIR STEAM CYLINDER AND VALVE OILS
For Compressors:
RUBILENE OILS
For General Lubrication:
COMMANDER OILS
For Ball and Roller Bearings:
BEARING GREASE AF

SINCLAIR REFINING COMPANY • 630 FIFTH AVENUE, NEW YORK 20, N. Y.

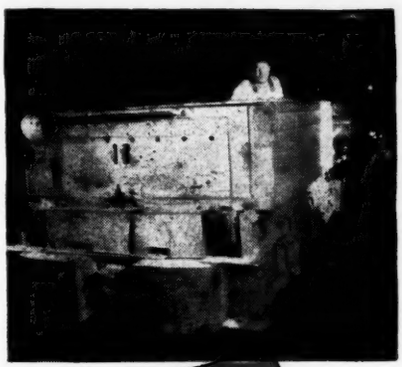
SINCLAIR

Lubricants for Industry

FINEST CRUDES + EXPERT RESEARCH and MANUFACTURING CONTROL = OUTSTANDING PERFORMANCE

Prepared to take it!

Gould Kathanode Batteries positively hold all useful active material in place.

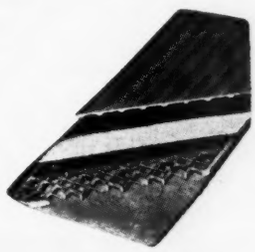


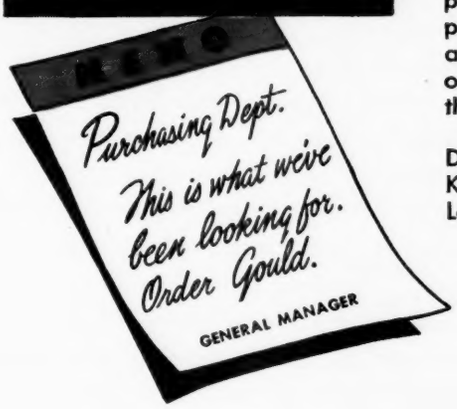
Hockey goalies are prepared for jolts and bruises. Similarly, Gould Kathanode Batteries are designed to meet the shocks and strains of moving vehicles in mine locomotive operations. In this service they deliver full power or better throughout their entire service life.

and here is the Reason why ...

In Gould Kathanode Batteries each positive plate is faced with mats of spun glass, in turn held in place by perforated rubber envelopes. Between each positive and negative plate additional protection is provided by Durapor Separators made of a highly porous rubber. This is the famous Kathanode construction that insures retention of all useful active material even under the most severe operating conditions.

Get the facts about Gould. Write Dept. 112 for Catalog 200 on Gould Kathanode Glassklad Batteries for Mine Locomotive Service.



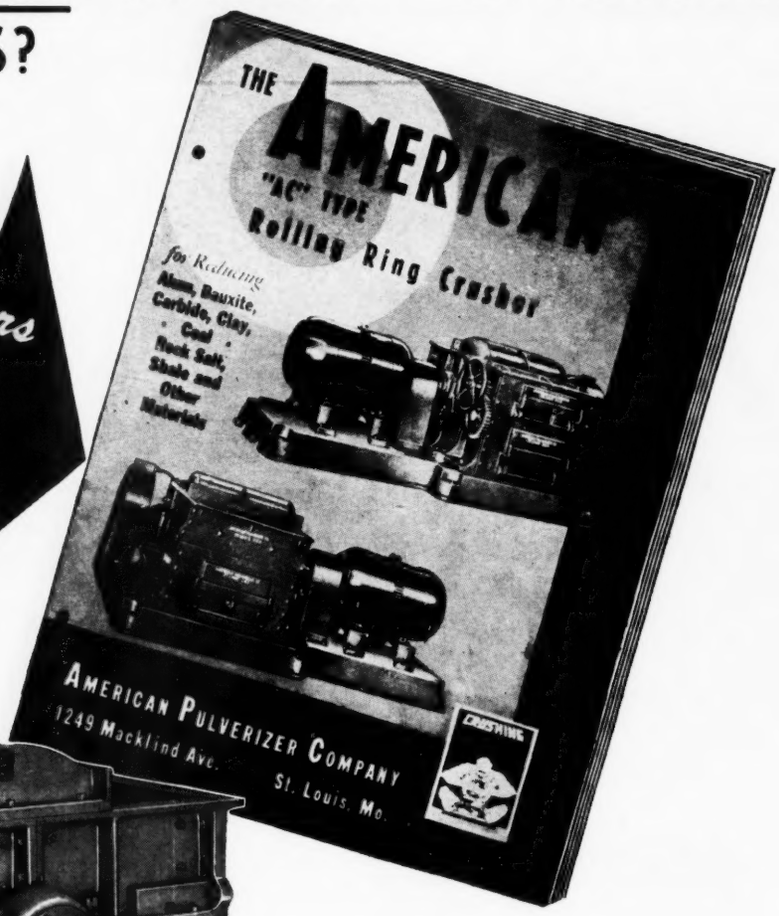


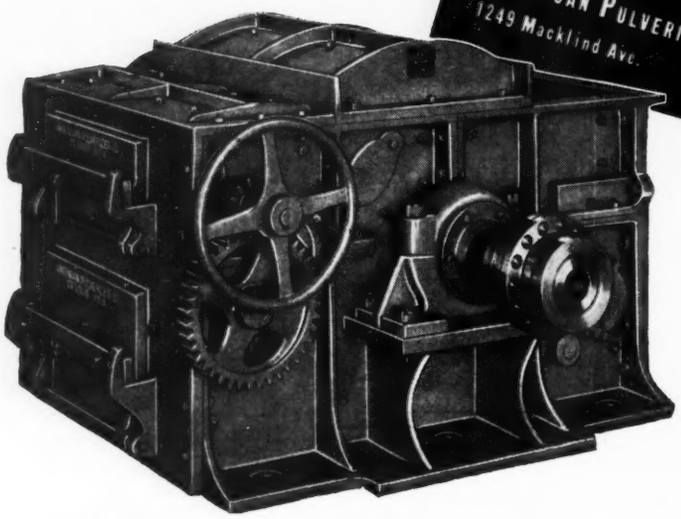
GOULD KATHANODE BATTERIES

GOULD STORAGE BATTERY CORPORATION, Depew, N. Y. Service Centers: Atlanta ● Boston ● Buffalo ● Chicago ● Cincinnati ● Cleveland Detroit ● Kansas City ● Los Angeles ● New York ● Philadelphia ● Pittsburgh ● St. Louis ● St. Paul ● San Francisco ● Seattle ● Zanesville

HOW TO GET MORE EFFICIENCY for REDUCING INCREASED COSTS?

Many operators have found the answer in here....





The efficient performance of American Crushers is based upon the shredder ring action that splits by rapid impact rather than crushes for uniform sizing and high rate of reduction. Capacities up to 500 TPH.

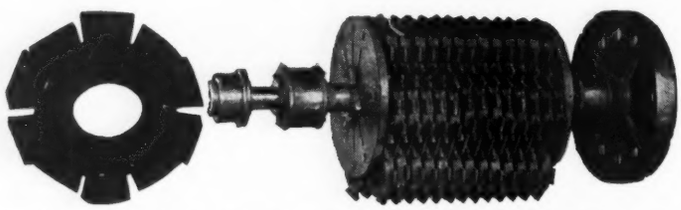


Illustration shows single shredder ring with its 20 cutting edges and heavy-duty rotor equipped with multiples of shredder rings.

The new "AC" bulletin is packed with facts, data and specifications on the American "AC" Crusher and it gives specific reasons and examples why the "AC" Crusher has proven so highly efficient and dependable in many mines throughout the country. Thoroughly illustrated, it shows the compact, sectional construction and the rugged design of these crushers as well as actual plant installations. If you are looking for a more efficient method of coal reduction send for the "AC" bulletin now!

American PULVERIZER COMPANY

Originators and Manufacturers of Ring Crushers and Pulverizers

1349 MACKLIND AVE.
ST. LOUIS 10, MO.

New! ROE-FLAT WIRE SCREEN

—up to 90% more wear than ordinary crimp types

It's here at last—a new, better way to combine the tonnage output you get from maximum open area with the long-life economy of heavier wire diameters.

In *Roe-Flat,* Roebling introduces a crimping method that provides an *absolutely flat* wearing surface. Without reducing open area, without sacrificing volume of production, *Roe-Flat* gives you up to 90% longer wire screen life!

Here's why:

1. *Roe-Flat* has over 75% more metallic wearing surface than ordinary crimps—because wear is spread evenly over practically all the surface of the wires, not concentrated on the raised intersections.

2. With parallel wires on the same plane, there's less blinding because of *Roe-Flat's* unique construction.

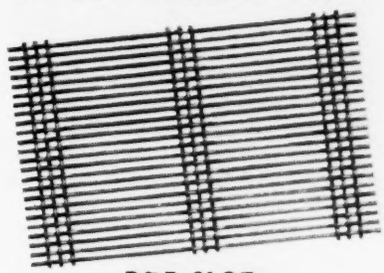
3. Accurate size of openings assures uniform product, helps increase screening production.

4. Improved quality steel is used, to increase *Roe-Flat's* resistance to abrasion, wear and fatigue.

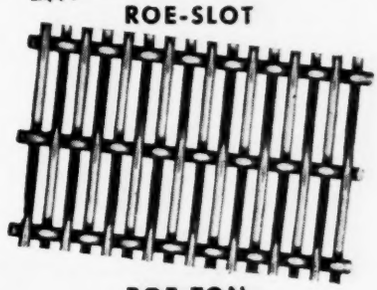
The advantages of *Roe-Flat* crimp can be incorporated in wire screening of practically every design. Get the full story. Write today for the facts.

JOHN A. ROEBLING'S SONS COMPANY
Woven Wire Fabrics Division
TRENTON 2, NEW JERSEY

TWO OTHER WAYS TO CUT SCREEN COSTS



ROE-SLOT



ROE-TON

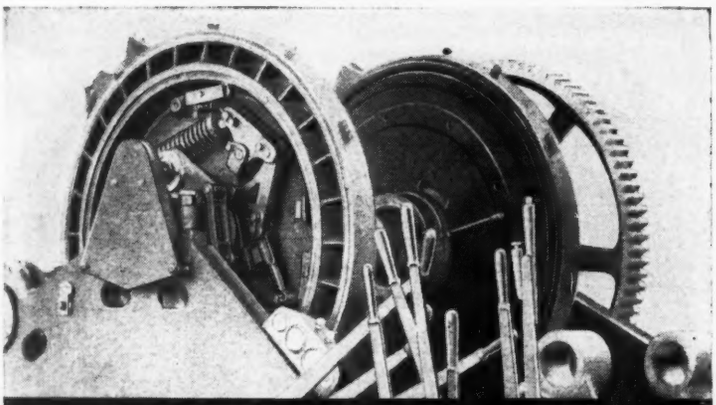
ROEBLING

A CENTURY OF CONFIDENCE

Manufacturers of Wire Rope and Strand • Fittings • Slings • Suspension Bridges and Cables • Aircord, Aircord Terminals and Air Controls • Aerial Wire Rope Systems • Electrical Wire and Cable • Ski Lifts • Hard, Annealed or Tempered High and Low Carbon Fine and Specialty Wire, Flat Wire, Cold Rolled Strip and Cold Rolled Spring Steel • Screen, Hardware and Industrial Wire Cloth • Lawn Mowers

KOEHRING

Output Per Shift



Engine power does the heavy work, supplies 90% of the effort when operator sets these main drum clutches on the Koehring 605.

1 New Exclusive Power Clutch Steps Up Operator Efficiency

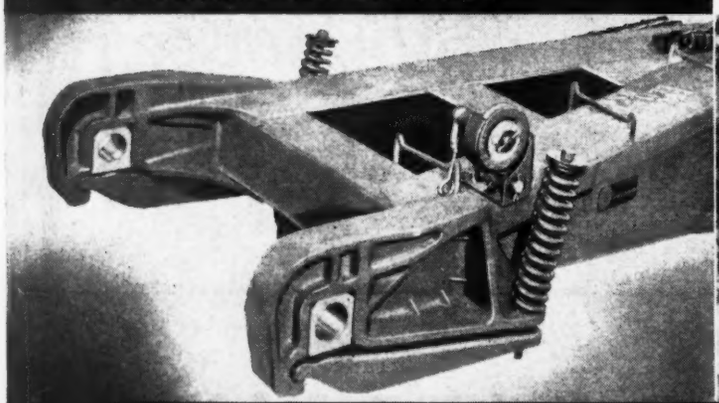
Top production all day long, because the Koehring 605 is easy on the operator. No physical fatigue, because heavy hand-lever pull is eliminated. Engaging the Koehring 605 Power Clutch, takes only 1/10 the lever pull required to set a manual clutch of similar size. Lever pull is rarely more than 7 lbs. No nervous fatigue, because "Feel of Load" has been retained. Clutch is completely responsive.

Light lever pull, 7 lbs. average, eliminates operator fatigue. No costly production letdown at shift end.

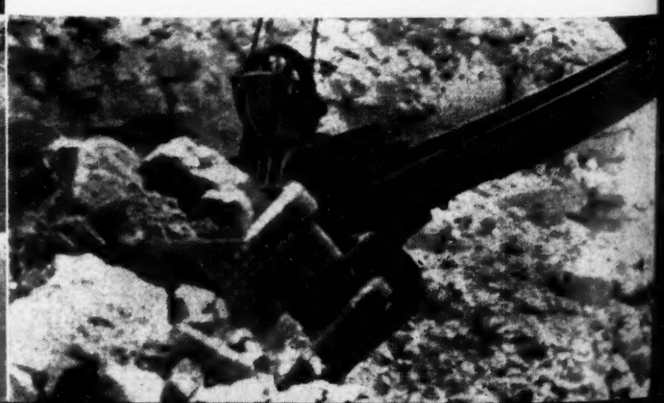
2 Boom Foot Shock Absorbers Step Up Rock Digging Output

Coil-spring shock absorbers, one on each side of boom foot, protect the Koehring 605 against boom strains and sudden loads. This not only insures against boom troubles and delays, but also speeds up entire digging cycle. With the 605, your operator can use full speed up through the bank without fear of catching a ledge or niggerhead on the corner . . . can use full throttle on the swing, brake sharply over the truck, letting the shock absorber take care of "whip" action.

See your Koehring Distributor for more information on the 605.



Two coil-spring shock absorbers, one on each side of boom-foot, cushion out shocks and stresses of rock handling.



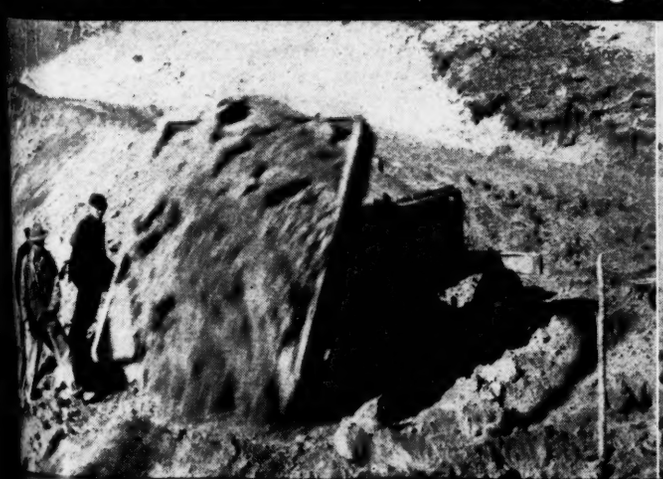
With entire shovel shock-absorber protected, it's safe to handle big dipper loads like this. No danger of boom trouble here.

KOEHRING COMPANY Milwaukee 10, Wis.

Subsidiaries: JOHNSON • KWIK-MIX • PARSONS

605 SHOVEL
Stepped Up 2 Ways

KOEHRING DUMPTOR: A Hauling Unit Built by a Shovel Manufacturer

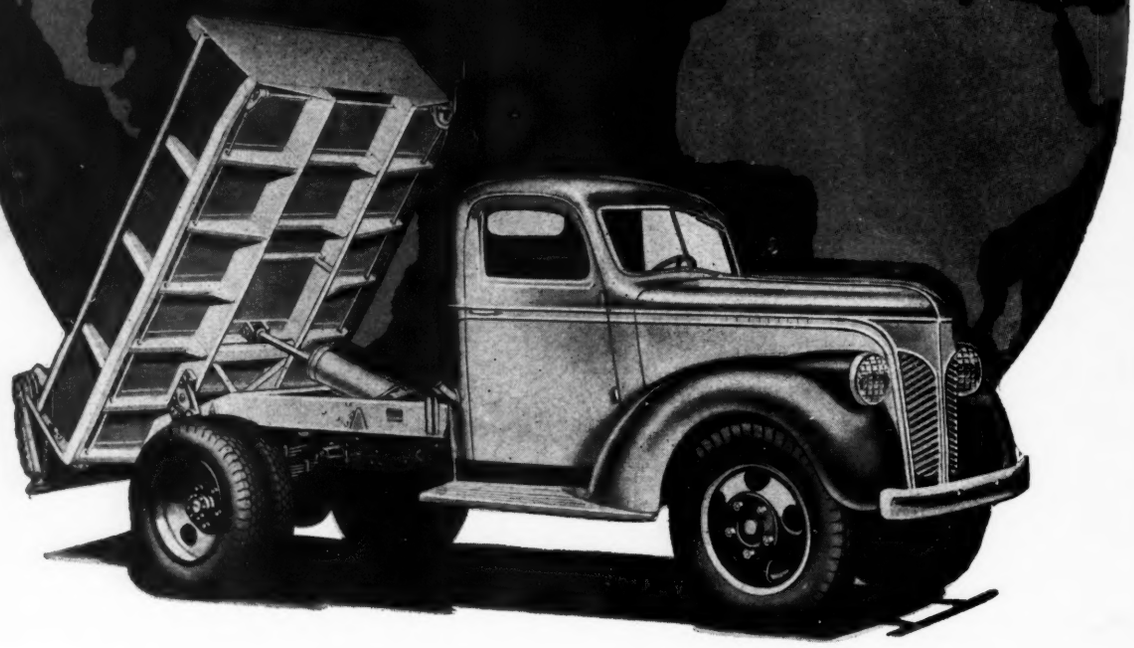


Gravity Dump . . . No Body Hoist: Touch release lever and gravity tilts scoop shaped body instantaneously. Always dumps fast and clean. No maintenance on hoist unit.

High Speed . . . Reverse or Forward: No slow turns shuttling from shovel to dump. Dumptor travels as fast in reverse as forward. Eliminates time wasted turning, speeds spotting.

IN USE EVERYWHERE

They've got it good!



From one end of the world to the other, you'll find Gar Wood Hoists and Dump Bodies in action. The reason? They're designed, engineered, and built to do specific jobs, *no matter how tough*. Hydraulically operated, with simple controls... they dump *cleanly*, *quickly*, and *easily*... make it possible to get to the next job faster.

No matter what kind of material you work with... sand, gravel, rock, coal, or construction materials... there's a Gar Wood Hoist and Dump Body to make the job easier... help you make money, faster.

Gar Wood Hoists and Dump Bodies have been, and are constantly being proven all over the world on the toughest jobs. For *your* next job, specify Gar Wood.

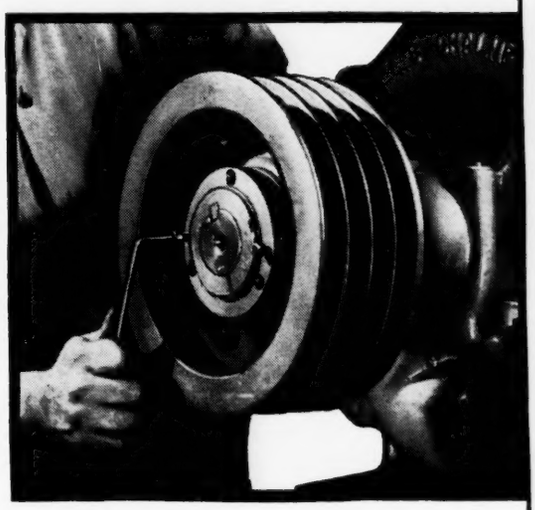
ROAD MACHINERY
HEATING UNITS • MOTOR BOATS
WINCHES AND CRANES

GAR WOOD
GW
TRADE MARK
INDUSTRIES

Easy-Mounting, Fast-Locking Sheave

Pays Off

The First Time You Put It On!



"MAGIC-GRIP" *sheaves offer time-saving, money-saving features!*

EVEN if you install the sheave only once, and never change it again — it pays to get a "Magic Grip" sheave! For frequent changes, naturally, your savings pyramid.

- **No filing or reaming.** "Magic-Grip" bushing slides easily, even on oversize shafts.
- **No hammering or forcing** to damage motor bearings.
- **No wheel puller needed** to get the sheave off.
- **No set screws** to mar or score the shaft.
- **No wobble or blacklash.** "Magic-Grip" sheaves lock to shaft with shrunk-on grip.

HOW DOES IT WORK? Sheave and bushing come completely assembled. You just slip it on the shaft — align — and tighten three screws. *That's all!* And it comes off just as easily.

Standardize on time-saving, money-saving "Magic-Grip" sheaves. They're heavy duty, precision made and finely finished — the best sheaves you can buy . . . the best economy in the long run. Get them through your nearest A-C dealer or office.

ALLIS-CHALMERS, MILWAUKEE 1, WIS.

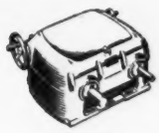
A 2165

TEXROPE .. Greatest Name in V-Belt Drives

"Super 7" V-BELTS
Five Types — Sizes to suit every power transmission job.

Texsteel, Texdrive, "Magic-Grip"
— sheaves in a full range of sizes, grooves.

"Vari-Pitch" SHEAVES
Exact variations in speed, stationery or motion control.



SPEED CHANGERS
Speed variations up to 375% at the turn of a crank.

ENGINEERING
Finest V-Belt engineering talent in the world—at your call.

TEXROPE "Super 7" V-Belts result from the cooperative research of two great companies — Allis-Chalmers and B. F. Goodrich. They are sold only by A-C.

ALLIS·CHALMERS

One of the Big 3 in Electric Power Equipment — Biggest of All in Range of Industrial Products

1847 1947
A CENTURY OF SERVICE
to Industry
THAT MADE
America Great

EXECUTIVES CAME...

THEY SAW... THEY SAID. WONDERFUL!

Executives of the New York Central Railroad wanted to see what actually went on in the brand new coal preparation plant of the Blackfoot Coal and Land Corporation in Pike County, Indiana, near Evansville. So they visited this modern plant for the opening ceremonies.

All of these officials marvelled how raw coal, already of fine quality, entered the plant at the top and came out at the bottom further beneficiated into super-select clean coal . . . screened for size, washed, dried, and loaded into waiting coal cars. The entire operation was completely automatic on a production line basis.

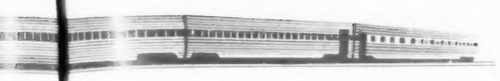
That day, while these busy executives were looking, they saw coal prepared (500 tons per hour) to meet buyers' specification, start to waiting markets, and to bring premium prices.

Yes, they said . . . wonderful!

(Reproduction of advertisement substantially as it appears in Fortune Magazine.)

McNally Pittsburg Manufacturing Corporation, Pittsburg, Kans. • Morrow Manufacturing Co., Subsidiary, Wellston, Ohio.
Engineering & Sales Offices: Chicago (1), Ill. • Pittsburgh (22), Penna. • Columbus, Ohio • Wellston, Ohio • Caixa Postal 1310, Rio de Janeiro, Brazil

A MILESTONE IN COAL PRODUCTION ACHIEVEMENT

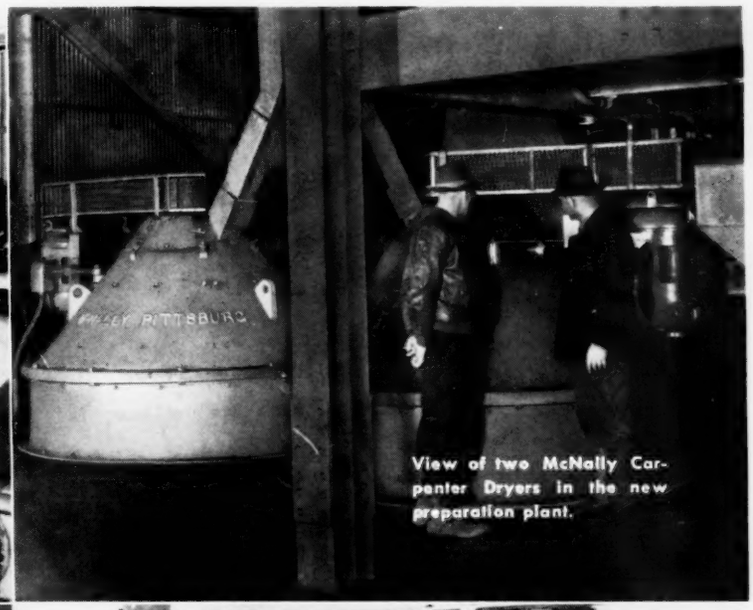


Look behind the streamlined exterior of this brand new coal preparation plant and you will find, as you expect, a master plant layout.

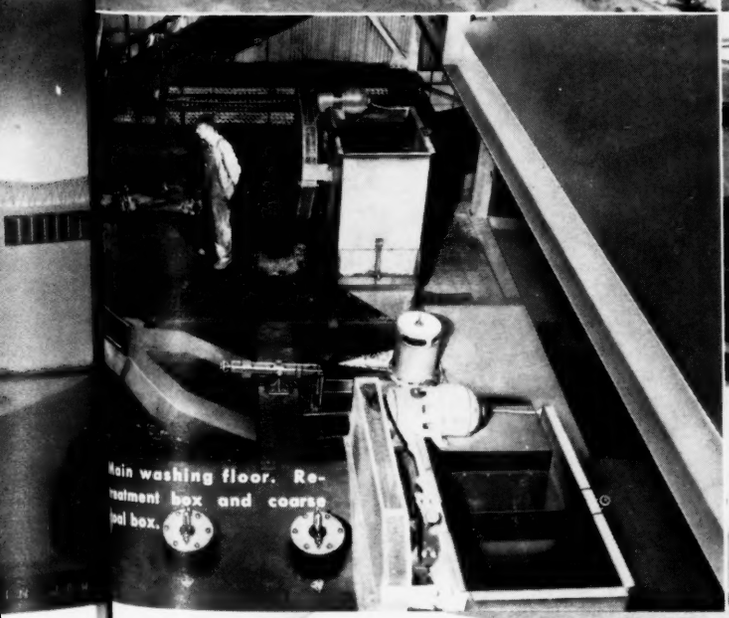
The wisely planned cubicle interiors inspire efficiency. Light flows through the continuous sash into every corner. Workers and management take equal pride in the specially built equipment . . . washers, dryers, conveyors . . . which perform automatically with scarcely any need for supervision. Raw coal can be transformed quickly and at low cost for cleaning, into specification fuel for the waiting premium-price market.

McNally Pittsburg technical staff welcomes the opportunity to discuss coal preparation projects . . . large or small . . . with the production and executive officials of your company.

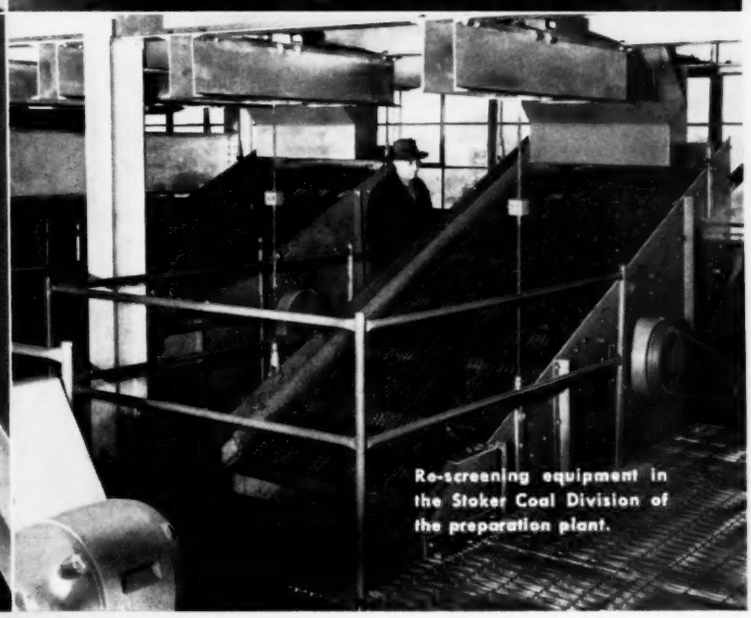
Operating mixing control gate on washed coal sizing screen, while plant is in operation.



View of two McNally Carpenter Dryers in the new preparation plant.



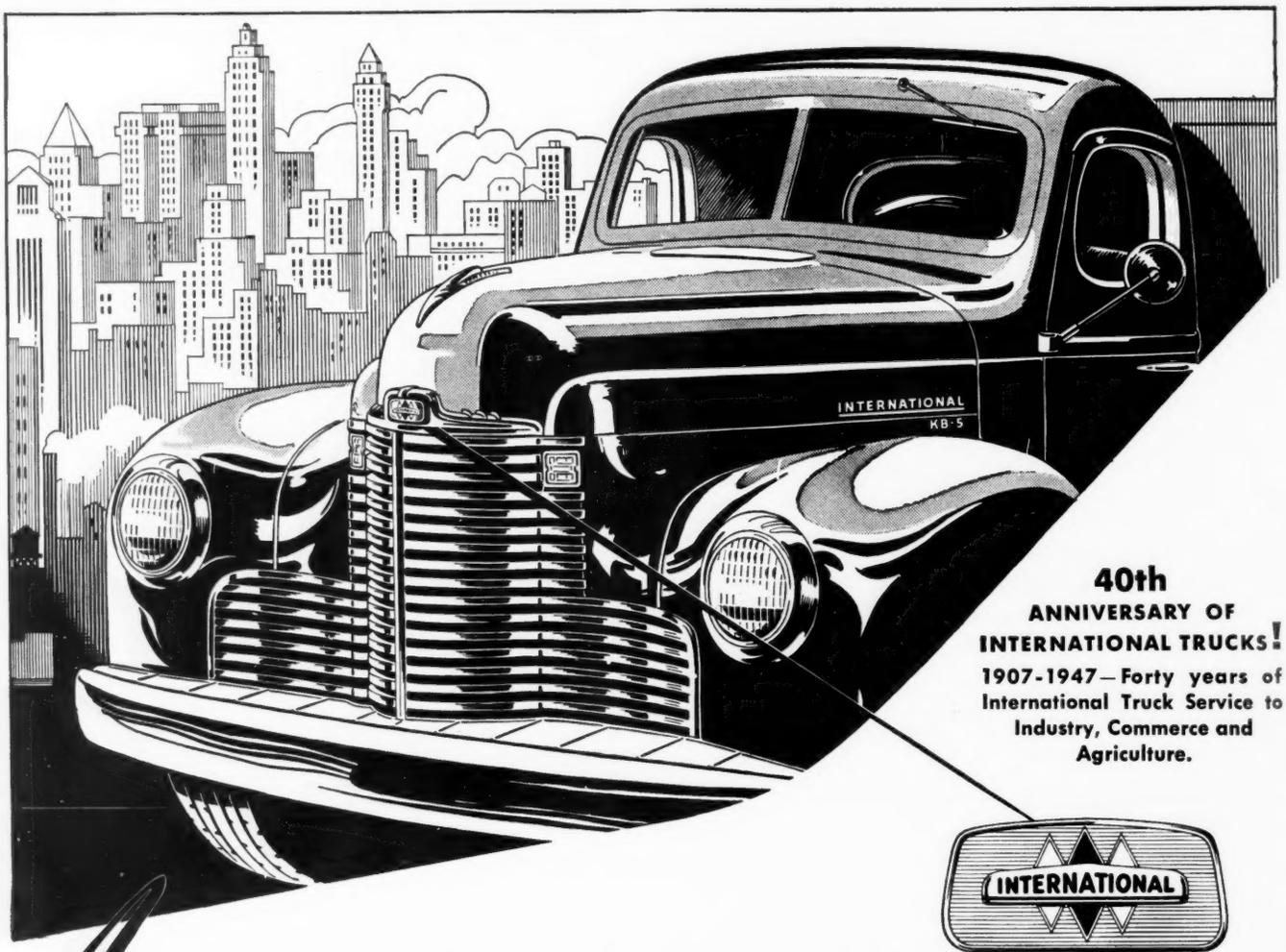
Main washing floor. Refuse treatment box and coarse coal box.



Re-screening equipment in the Stoker Coal Division of the preparation plant.

McNALLY PITTSBURG

MANUFACTURERS OF EQUIPMENT TO MAKE COAL A BETTER FUEL



40th
ANNIVERSARY OF INTERNATIONAL TRUCKS!
1907-1947—Forty years of International Truck Service to Industry, Commerce and Agriculture.

INTERNATIONAL

Announcing—NEW MODELS INTERNATIONAL TRUCKS

Truck owners will operate them—drivers will drive them—*with greater pride than ever before.*

They're the new KB Models of International Trucks—outstanding products of advanced design, engineering and research—newly styled with flowing lines sharply accented by gleaming chrome, and with 95 features and improvements variously incorporated throughout 15 basic models.

And fully qualified to do their jobs with new economy, new ease of operation, and the rugged stamina for which Internationals are *famous!*

They're the finest values in more than 40 years of International Truck history. And International values have always been outstanding—so outstanding that for 16 years more heavy-duty Internationals have served American commerce and industry than any other make.

In the *complete* International Line there's the right truck for every hauling job. And back of every truck is *specialized* International Service—supplied by the nation's largest company-owned truck-service organization, International Branches—and by International Dealers everywhere.

Yes, the new KB Internationals will be owned and driven with pride—with pride and profit—because these rugged trucks perform with unbeatable economy.

TRUCK OPERATORS!
For details of the 95 FEATURES AND IMPROVEMENTS in various models of the new KB Internationals, see your International Branch or Dealer.

Motor Truck Division
INTERNATIONAL HARVESTER COMPANY
180 North Michigan Avenue, Chicago 1, Ill.

Tune in James Melton on "Harvest of Stars" every Sunday! NBC Network. See newspapers for time and station.

INTERNATIONAL

INTERNATIONAL *Trucks*

ANNOUNCING

P&H's New 6-yd Electric Shovel

Now Available with "Magnetorque" Hoist Drive

Magnetorque Drive simplifies the entire hoisting machinery including the power units . . . a simple AC induction motor does the driving.

Here are some of its outstanding advantages:

1. It eliminates the customary hoist generator and its maintenance.
2. It provides smooth Ward Leonard performance with faster plugging.
3. It reduces peak power demands . . . lowers power costs.
4. It eliminates the customary slip-friction hoist clutch . . . there is far less wear.
5. It cushions shock loads . . . reduces overall maintenance.

Other Added Values in P&H's 6-yd Electric Shovel include:

DIRECTRON CONTROL — eliminates all make-and-break contacts in control system.

INDEPENDENT PROPEL DRIVE — eliminates all mechanical clutching — provides faster move up.

WORM DRIVEN CROWD — smoother, faster, more responsive.

FILTERED AIR CAB—provides only clean air for cooling motors and generators.

ELECTRICAL EQUIPMENT—all designed specifically for shovel service — not adapted for it.

ALL WELDED CONSTRUCTION — provides greater strength for maximum shock resistance and permanent alignment of machinery.

• • •

P&H's Added Values are all directed toward the same basic objective . . . to insure steadier, more dependable digging in the open pit at a lower cost per ton. Details on this P&H Model 1600 Electric Shovel are yours for the asking.

P&H

ELECTRIC SHOVELS

4540 W. National Ave.
Milwaukee 14, Wis.

HARNISCHFEGER CORPORATION

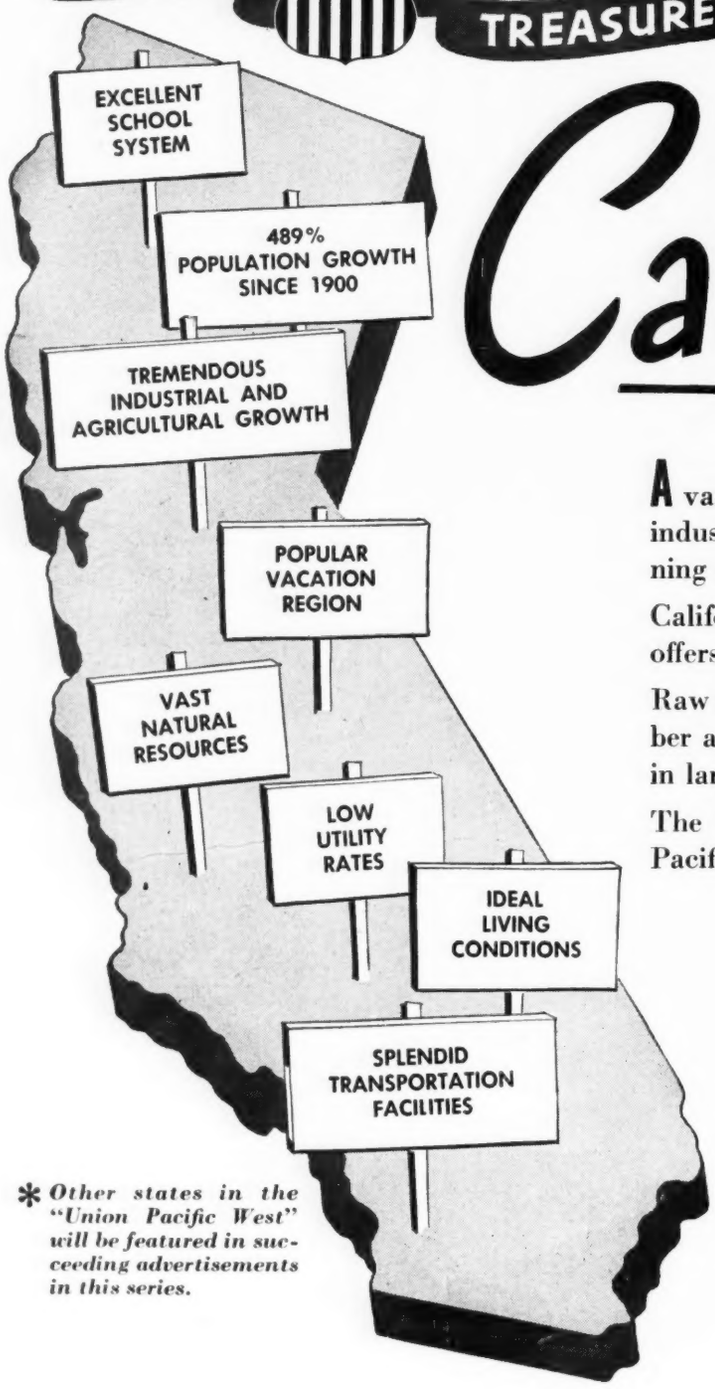
EXCAVATORS · ELECTRIC CRANES · ARC WELDERS · P&H · HOISTS · WELDING ELECTRODES · MOTORS

EADING THE WAY IN ELECTRIC SHOVEL DEVELOPMENTS

UNION PACIFIC

TREASURE MAP OF INDUSTRY

California*



A vast opportunity for development awaits industrial and commercial concerns planning a west coast location.

California's population, steadily increasing, offers a tremendous easy-to-reach market.

Raw materials . . . minerals, petroleum, lumber and agricultural products are available in large quantities.

The Golden State is ideally located for Pacific export trade.

Hydro-electric power, nearby natural gas and oil fields, a mild all-year climate are industrial advantages.

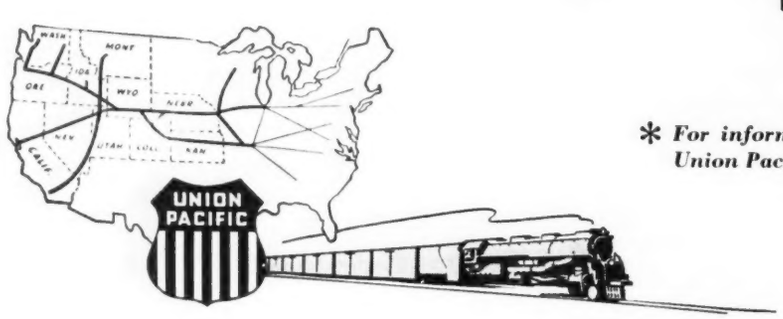
Freight transportation facilities are unsurpassed. California is one of eleven western states served by the Union Pacific Railroad.

For industrial expansion, consider California. For dependable, all-weather transportation, to or from the West, we suggest—

be Specific – say "Union Pacific"

* *Other states in the "Union Pacific West" will be featured in succeeding advertisements in this series.*

* *For information address Industrial Department, Union Pacific Railroad, Omaha 2, Nebraska.*



UNION PACIFIC RAILROAD

THE STRATEGIC MIDDLE ROUTE

CONFIDENCE... how much is it worth?

IN 1844, three years before Alexander Graham Bell was born, and long before the first Prairie-Schooner crossed the Mississippi River, John August Roebling's confidence in the suspension principle of construction so impressed the engineers of the State of Pennsylvania, that they authorized him to build the world's first suspension aqueduct.

How much is his confidence worth to all the thousands of engineers who followed and to humanity in general that have benefited from his pioneering venture?

And how much is the confidence of the John A. Roebling's Sons Company in the future of American industry worth to you, that keeps Roebling development and Roebling products in the lead?

Roebling's greatest asset is your confidence in Roebling and its confidence in your future. That is why Roebling's every effort is dedicated to the preservation of this confidence—your's and Roebling's.

For performance—mining men turn with confidence to Roebling Mining Cables

As with any product, the final test of Roebling Mining Cables is performance. But the confidence with which mining men specify Roebling Cables means their performance can be predicted—in advance.

A typical example is Roebling Roeclad Portable Cable, widely used on portable mining equipment. It's made of the finest available materials... in single or multiple conductors... in a wide range of sizes . . . with or without ground wires. It's soundly designed and engineered to resist impact and crushing. It is the best Roebling knows how to make.

And not only the cable commands your confidence, for at Roebling product and service go hand in hand. Experienced engineering service will help you get *all* the dependability and long life you pay for. Just call our nearest branch office and talk to your Roebling Field Engineer.

JOHN A. ROEBLING'S SONS COMPANY
TRENTON 2, NEW JERSEY
Branches and Warehouses in Principal Cities

Manufacturers of Wire Rope and Strand • Fittings • Slings • Screen, Hardware and Industrial Wire Cloth • Aerial Wire Rope Systems • Hard, Annealed or Tempered High and Low Carbon Fine and Specialty Wire, Flat Wire, Cold Rolled Strip and Cold Rolled Spring Steel • Ski Lifts • Electrical Wire and Cable • Suspension Bridges and Cables • Aircord, Aircord Terminals and Air Controls • Lawn Mowers

ROEBLING

A CENTURY OF CONFIDENCE

JAR ROEBLING

WALWORTH

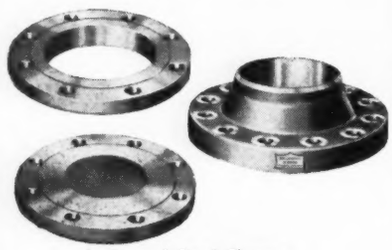
Pipe Fittings

A complete line of standardized types in

STEEL
in series 150 to 1500

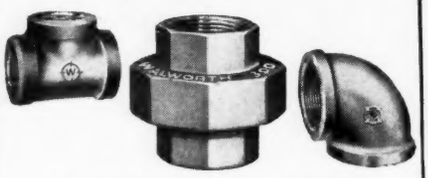
Cast Steel Fittings

Steel Welding Fittings



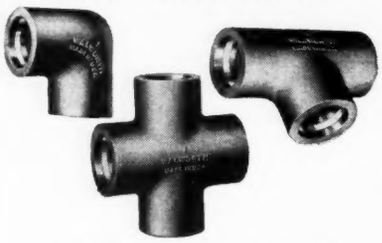
Forged Steel Flanges

BRONZE



125 Lb and 250 Lb, Screwed ends

150 Lb and 300 Lb Walseal ends

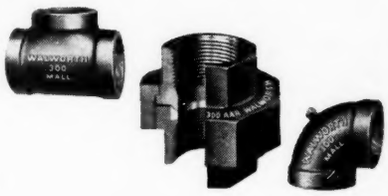


3,000 Lb O.W.G., Walseal ends

IRON

125 Lb and 250 Lb Cast Iron

150 Lb Malleable Iron



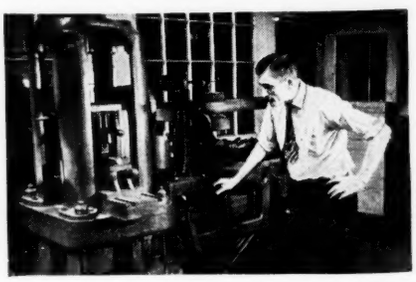
300 Lb Malleable Iron

Walworth's comprehensive line of pipe fittings is made in a wide range of types and sizes to meet every piping requirement. A few of the many regular Walworth fittings are illustrated above. All Walworth fittings are made to the highest standards of quality, both as to dimensional accuracy and metallurgical properties. In design, construction, and performance, they reflect Walworth's 103 years' experience in the manufacture of quality valves and fittings.

For detailed information on Walworth's complete line of valves, fittings, and pipe wrenches, see your local Walworth distributor or write for a free copy of Catalog 42.

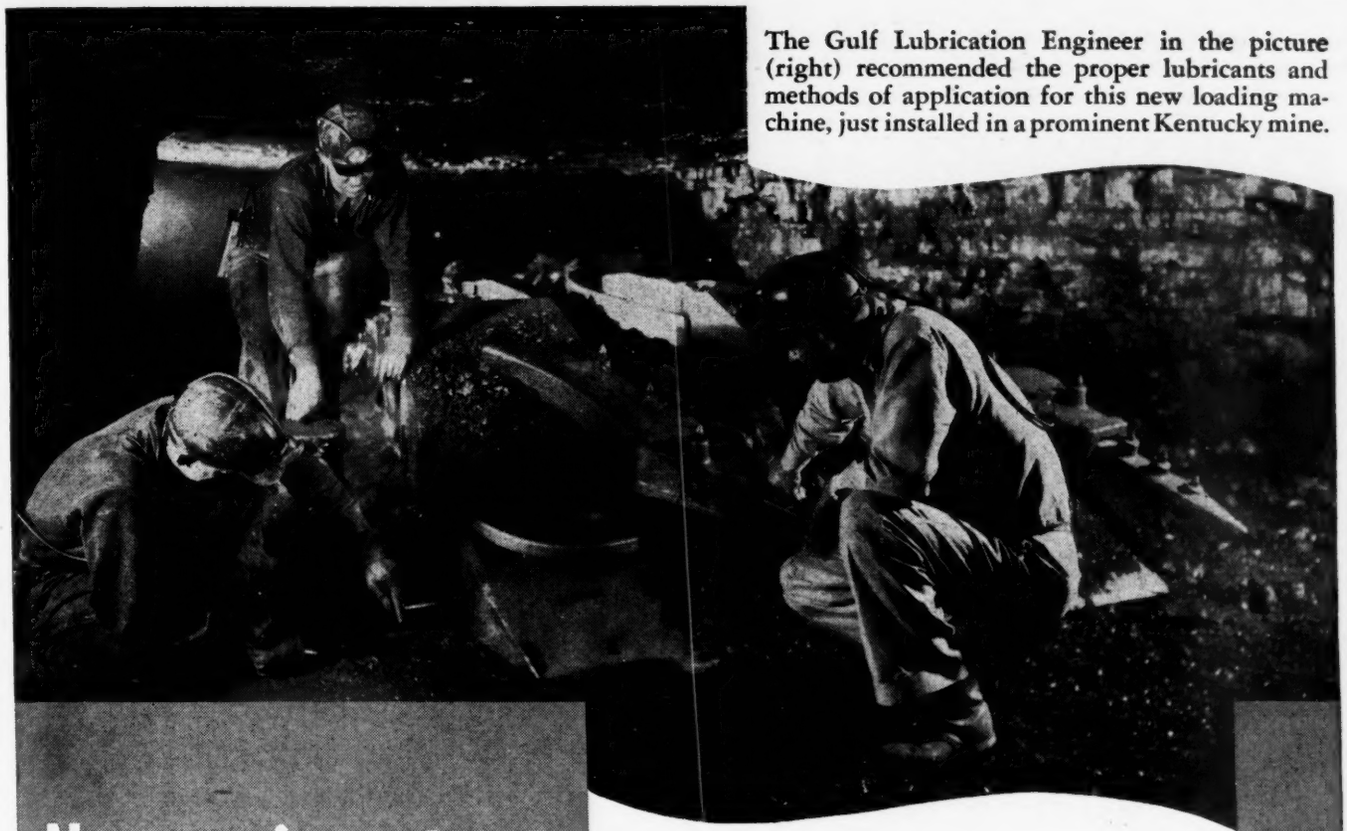
WALWORTH
valves AND fittings
60 EAST 42nd ST., NEW YORK 17, N. Y.

LABORATORY CONTROL



To assure strict adherence to specifications, sample test bars of the metals from which Walworth Pipe Fittings are made are subjected to regular testing in Walworth laboratories These and other regular controls and inspections assure the high quality of all Walworth Pipe Fittings. The illustration shows a test on a cast iron transverse bar.

DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD



The Gulf Lubrication Engineer in the picture (right) recommended the proper lubricants and methods of application for this new loading machine, just installed in a prominent Kentucky mine.

New equipment gets the right start for a long life

when the

GULF LUBRICATION ENGINEER

is "in the picture"

START your new mechanized equipment out right—have a Gulf Lubrication Engineer "in the picture" just as soon as it's delivered.

This trained specialist will check over every unit, then recommend the proper oils and greases which will provide an extra margin of lubrication efficiency.

You will find that this progressive approach to effective lubrication results in better machine performance, less wear, lower maintenance costs, and extra years of useful life.

The helpful counsel of a Gulf Lubrication Engineer—and the Gulf line of more than 400 quality lubricants—are available to you through 1200 warehouses located in 30 states from Maine to New Mexico. Write, wire, or phone your nearest Gulf office today.

Gulf Oil Corporation · Gulf Refining Company

Division Sales Offices:

Boston · New York · Philadelphia · Pittsburgh · Atlanta
New Orleans · Houston · Louisville · Toledo

GULF INDUSTRIAL LUBRICATION

Why TRIM YOUR LOADS TO MEET ROAD CONDITIONS?

WALTER 100% TRACTION

hauls huge payloads in ANY running conditions

. . . on the road or off the road.

DIFFICULT running conditions need not limit the size of your trucks or your payloads—either on the shovel-to-plant run or in hauling overburden.

Walter Tractor Trucks, with the great power and traction of the 4-Point Positive Drive, are hauling 30 to 60-ton payloads in the soft, wet, slippery surfaces and steep grades met in open pit mining.

It is important to note that these huge loads are hauled with the speed of smaller trucks; with easy, safe maneuvering and handling; and without tearing up your roads.

Among the features contributing to this performance are: Three automatic locking differentials which proportion torque to each wheel according to its traction, eliminating wheel-spin; suspended double reduction drive for larger gear capacity, less unsprung weight, less bouncing and jouncing on roads; engine-ahead-of-wheels for shorter wheelbase, better weight distribution; hydraulic steering, powerful air brakes; engines from 125 hp. to 350 hp.

WRITE for detailed literature on Walter Tractor Trucks and facts about their record in open pit mining.

WALTER MOTOR TRUCK CO. 1001-19 Irving Ave. Ridgewood 27, Queens, L. I., N. Y.

WALTER TRACTOR TRUCKS

Thor SUMP PUMPS Keep Pumping!

. . . *Improved Lubrication Assures Peak Efficiency*

In Sump Pumps, the *impeller shaft bearings* are the most vulnerable parts, with premature failure causing undue job delay and expense. Thor safeguards these vital points by a large grease reserve that is force-fed under continuous air pressure—pressure that further prevents foreign matter from working into the bearings. Because of this *exclusive feature*, Thor Pumps can be operated continuously up to a full shift without regreasing.

Thor Sump Pumps are designed to operate efficiently in clean or dirty water; in oil, sludge or sewage—either partially or fully submerged. Your nearby Thor Distributor will gladly demonstrate them as the economical answers to your sump-water problems.

INDEPENDENT PNEUMATIC TOOL COMPANY
600 W. Jackson Blvd., Chicago 6, Illinois

Birmingham · Boston · Buffalo · Cincinnati · Cleveland · Denver · Detroit
Houston · Los Angeles · Milwaukee · New York · Philadelphia · Pittsburgh
St. Louis · St. Paul · Salt Lake City · San Francisco · Toronto, Canada · London, England

Thor PORTABLE POWER TOOLS

PNEUMATIC TOOLS • UNIVERSAL AND HIGH FREQUENCY ELECTRIC TOOLS • MINING AND CONTRACTORS TOOLS

When the going gets tough...

You need a man like this. He's your Coal Field Supply Specialist. He knows that your coal must be moved fast and efficiently.

He knows, too, that you can't afford to run the risk of costly shutdowns caused by inefficient conveyor belting or machinery. That's why you can count on him to recommend equipment that will withstand severe punishment . . . carry more tons per dollar.

When you have to move heavy loads of coal, for example, he will recommend Ajax Underground Conveyor Belting and Robins Mine Conveyors. They're "Job-Engineered" by Hewitt-Robins to withstand impact loading of run-of-mine or sized coal.

You see, Hewitt-Robins offers you complete materials handling service . . . backed by a single source and single responsibility for both conveyor machinery and belting.

So, *before* the going gets tough, call your Coal Field Supply Specialist. He will recommend the Hewitt belting best suited to do your job cheaper, faster, and better.

Specify "Hewitt" . . . Phone the Hewitt distributor listed in the classified section of your phone directory. Or write to Hewitt Rubber of Buffalo, 240 Kensington Ave., Buffalo 5, N. Y.

Ajax Underground Conveyor Belting

HEWITT RUBBER
OF BUFFALO
Division of Hewitt-Robins Incorporated

"JOB-ENGINEERED" INDUSTRIAL HOSE • BELTING • PACKING

ALLIS-CHALMERS *First Again*

NOW WITH 1,000 HOUR LUBRICATION

Truck Wheels
Front Idlers
Support Rollers

GREASING JOB IS EASY FOR THIS OPERATOR

. . . no fighting through mud to reach truck wheels, front idlers and support rollers! With Allis-Chalmers' 1000-hour truck assembly lubrication, operator can select convenient time and spot to replenish lubricant.

"GOODBYE" to old-fashioned, expensive, time-consuming tractor maintenance methods.

NOW . . . truck wheels, idlers and support rollers on all Allis-Chalmers crawler tractors are GREASE-PACKED at the factory. Lubricant needs only to be replenished . . . not replaced . . . once every *1,000 hours*. That's . . . ONCE IN SIX MONTHS . . . on a 40-hour week basis! This long interval is made possible by taking full advantage of the improved Positive Seal, *exclusive in A-C tractors*.

What it means! Relieves you of the responsibility of frequent lubricating attention . . . results in less down time for greasing or repairs . . . considerably reduces lubricant cost . . . adds a factor of safety by assuring adequate lubrication for long operating periods. Result — your maintenance cost is reduced and tractor operating life extended.

For the full story of this and other features which make Allis-Chalmers tractors steady, high yardage movers, contact your Allis-Chalmers dealer.

ALLIS-CHALMERS
TRACTOR DIVISION • MILWAUKEE 1, U. S. A.

NOW "VENTUBE" IS MADE WITH NEOPRENE..

Tough, durable neoprene coating makes flexible ventilating duct even better than prewar type!

- LIGHTER IN WEIGHT
- MORE FLEXIBILITY
- EASIER TO COUPLE
- STANDS UP TO ACID
- RESISTS HEAT, AGING

We're glad we can now give you more value in your "Ventube"* than ever before—with tough, durable neoprene, the Du Pont synthetic rubber that gives such unusual service in conveyor belts, cable-jacketing and other equipment. "Ventube" is now coated with neoprene, and the "Ventube" fabric is thoroughly impregnated with a neoprene composition engineered to give long life and trouble-free service.

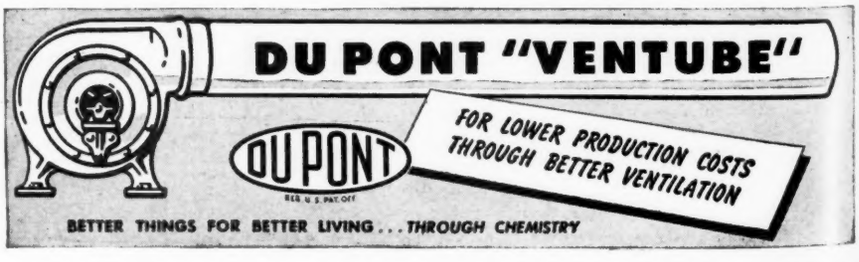
Many advantages of the new material: (1) Much more flexible for carrying air around curves and corners, for coupling and uncoupling; (2) Much lighter in weight, for lifting and carrying long lengths, and (3) Neoprene is long-lasting, withstands corrosive acid or alkali waters, resists oxidation from heat and aging. Not only better than wartime types, but even better than prewar "Ventube."

And remember that regular "Ventube," attached to a motor-driven blower fan of adequate capacity, delivers fresh air to men at work and that bad air and dust can be drawn off by the use of helical-type "Ventube" attached to a motor-driven exhaust fan. "Ventube" keeps temperatures low enough for efficiency, reduces down-time after blasting, speeds production in many ways, cuts accidents. It is easy to install, to move, to store. Low in both original and upkeep cost.

For further details, consult Du Pont Technical Service, Fabrics Division, E. I. du Pont de Nemours & Co. (Inc.), Fairfield, Conn.

• • •

*"*Ventube*" *is Du Pont's registered trademark for its flexible, synthetic-rubberized ventilating duct.*


DU PONT "VENTUBE"
DU PONT
FOR LOWER PRODUCTION COSTS THROUGH BETTER VENTILATION
BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

BELT CONVEYORS
IDLERS
PILLOW BLOCKS
COUPLINGS
GEARS
TAKE-UPS
BEARINGS
BASE PLATES
V-BELT DRIVES
PULLEYS
CLUTCHES
COLLARS
CHAIN DRIVES
SPROCKETS
SCREW CONVEYORS
BUCKET ELEVATORS
SCREW ELEVATORS
SPEED REDUCERS

Capacity

Manufacturing capacity is determined by many things in addition to the physical facilities of the plant: foresight in planning, skill in engineering, painstaking care in scheduling, experience and precision in workmanship, efficiency in management, and employment of modern business and manufacturing methods.

Here at Continental the proper valuation of these qualities has won national recognition for Continental products.

Our Industrial Division has become a leader in the manufacture of *Materials Handling and Power Transmission equipment*. Our line of standard products is complete.

We are meeting schedules on deferred orders, and making immediate shipment on many items.

We are interested in your orders and inquiries.

Industrial Division

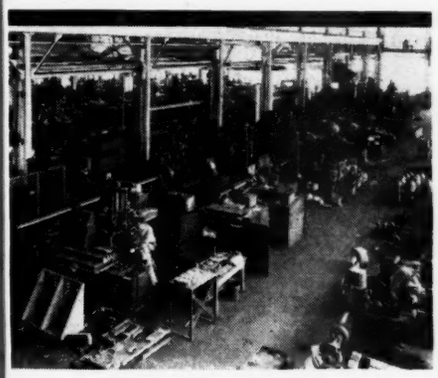
CONTINENTAL GIN COMPANY

BIRMINGHAM, ALABAMA

ATLANTA • DALLAS • MEMPHIS

An aerial view of the Birmingham plant and general office building.

A section of the heavy tool bay of our Birmingham plant.



A corner of one of our machine shops, showing the milling machine and drill press department in the background.

View of part of our Birmingham plant's steel fabricating department, showing shears, presses, brakes, etc., for handling a variety of fabricated steel work.

A scene in our Birmingham foundry. This foundry pours Meehanite metal exclusively.

Ashland PERMATREAT

BENEFITS INDUSTRIAL COAL USERS

In transit and in firebox the industrial coal user gains by burning oil-treated coal.

Ashland Permatreat reduces breakage and loss of coal in transit. The coal dewaters faster, unloads freely in cold weather. Bulk density is increased as much as 15 per cent, giving more uniform firebed.

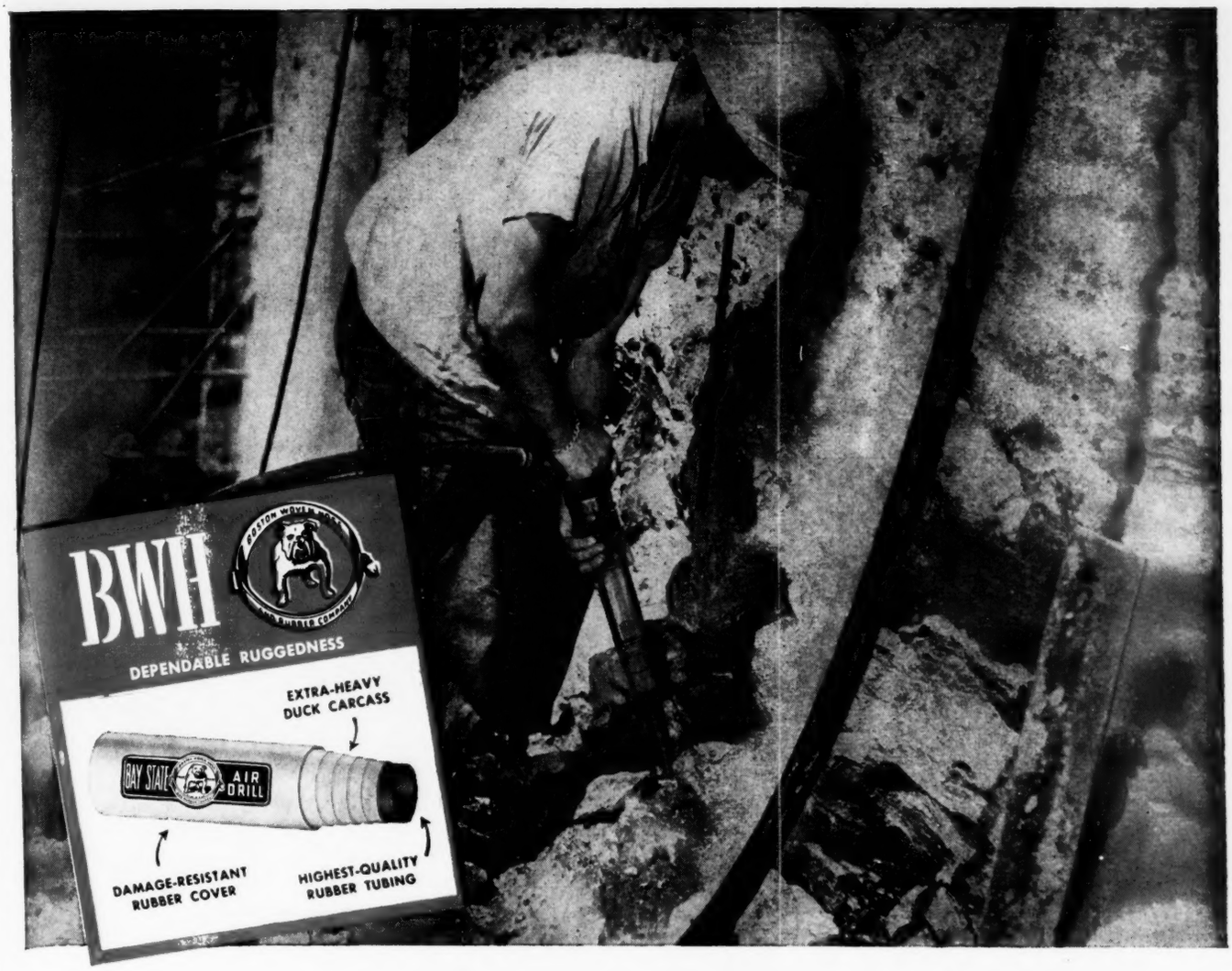
Coal sprayed with Ashland Permatreat retains consistent moisture content. It yields more uniform by-products, due to less oxidation. Handles easier, reduces equipment corrosion. Cuts operating costs while actually adding to BTU content.

For a readier market among industrial users, treat your coal with Ashland Permatreat.

Ashland PERMATREAT COAL SPRAY

ASHLAND OIL & REFINING COMPANY

ASHLAND, KENTUCKY



"ROUGHING IT" THE EASY WAY

Another problem solved by BWH!

Applying a new facing to a big western dam posed a problem for the contractor. The old face had to be "roughed" with compressed air into an irregular pattern to hold the new concrete. That meant finding an air hose that could "take" high pressures, heat and oil from the compressors, shocks from sharp falling rocks and contact with rocky surfaces. To handle this job, BWH recommended tough Bay State Air Drill Hose.

The tube of this rugged hose is made with the highest-quality, extra-heavy rubber . . . able to withstand the deteriorating action of hot oils. Several plies of strong duck, bonded together with long-life friction, form the carcass. Since the contractor selected 2½" hose, the duck had to be 40% heavier than for smaller sizes.

Tube and carcass were encased in a stout rubber cover . . . the strongest ever devised to resist surface damage. This powerfully built hose performed perfectly . . . helped the contractor finish the job without costly delays.

Bay State Air Drill Hose is just one of the many quality products manufactured by BWH. Whatever industrial rubber goods you need, look to BWH for dependable ruggedness . . . BWH distributors for dependable service.

HAVE YOU A JOB WHERE STAMINA COUNTS?

Bring us your toughest problems . . . we're specialists in solving them. Consult your nearest BWH distributor, or write direct.

BOSTON WOVEN HOSE & RUBBER COMPANY

Distributors in All Principal Cities

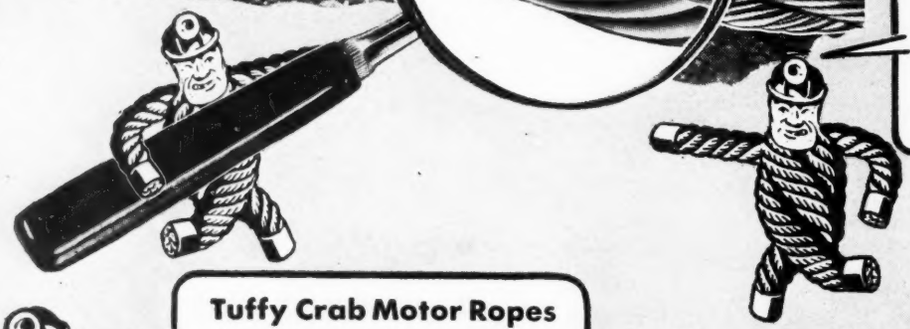
WORKS: CAMBRIDGE, MASS., U. S. A. • P. O. BOX 1071, BOSTON 3, MASS.

Tuffy WIRE R

Toughest Performers in a

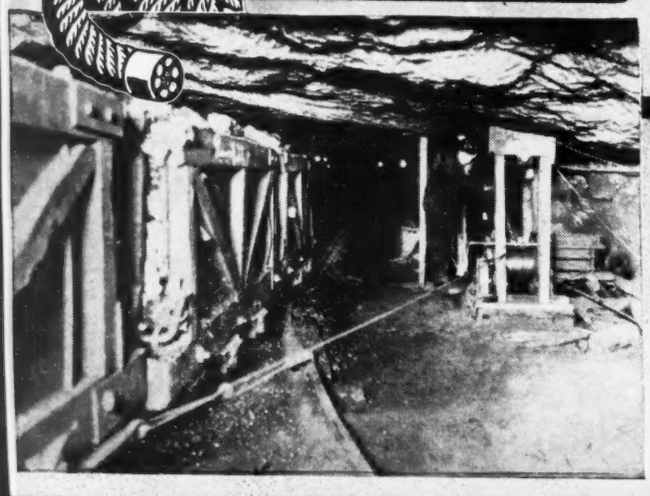
Four rope killing conditions in slusher mining gang up to make ordinary rope short lived. Standard rope constructions are available to meet them singly but not the whole gang of them.

For many months a new wire rope (originated by Union Wire Rope Engineers in cooperation with large slusher operators) has been successfully battling this gang of rope killers. Union's Tuffy, 3-strand is cutting slusher rope costs 25%. Tuffy has high resistance to abrasion. Tuffy is rigid and non-collapsing to eliminate drum crushing. Tuffy has elasticity to take up the shocks of load snagging and flexibility to operate over under-sized tail sheaves without fatigue. Next time reeve your slusher loaders with Tuffy.



Tuffy Slusher Rope Sets New High In Slusher Mining Performance. Cuts Rope Costs 25%.

Tuffy Crab Motor Ropes Are Rugged But More Flexible For Easy Handling.

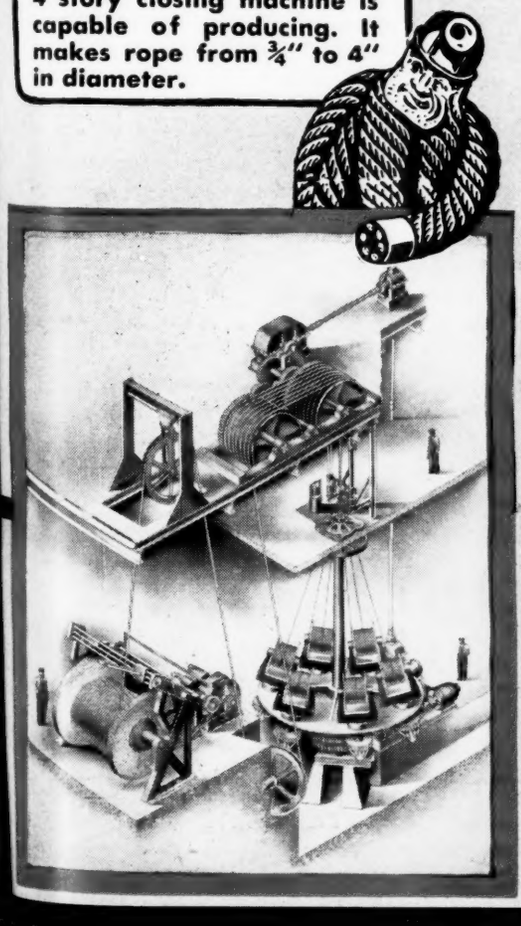


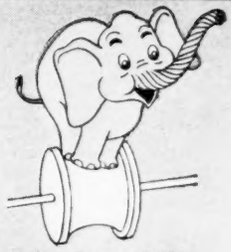
ROPES

and on Earth

There is a Tuffy wire rope fitted by specialists to every mining job. For mine work from overburden to deepest stope, Tuffy wire ropes are first designed then constructed to operate more efficiently and longer. You can't begin to match Tuffy performance with ordinary wire rope cut from stock reels. Tuffy mining machine ropes, for instance, are cut to length, end clipped, packaged and job marked. Tuffy mine machine, crab motor and winch ropes are Union-formed, i. e. pre-formed to wear and work like a trained elephant. For Union-formed 18 x 7 non-rotating hoisting ropes, yesterday's outstanding record is just an every day chore.

Big as they are, no strip shovel is big enough to require the 27 ton, continuous length wire rope which this 4 story closing machine is capable of producing. It makes rope from ¾" to 4" in diameter.





Union-Formed Rides Better on Grooves

. . . does not spin and grind through blocks or over sheaves.

Union-Formed is Safer to Handle

. . . worn, broken wires do not spring out and porcupine but continue to lie close to the rope.

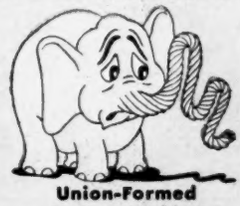
Union-Formed is Flexible and Relaxed

. . . bends in any direction, yet has "toughness" to withstand jerking and other punishing strain.

union-formed is *Preformed*

Union-Formed Spools Better

. . . even with a light load it winds evenly and tightly.



Union-Formed Resists Kinking

. . . because wires and strands are free of internal stress, they do not fight to get out of their pre-formed positions.

Union-Formed Resists Bending Fatigue

. . . withstands more bends, even reverse bends, because it is more stress-free internally.

union *Wire Rope* **CORPORATION**

2130 MANCHESTER AVE.
KANSAS CITY 3, MO.

Send the facts on Tuffy . . .

- ☐ Slusher Ropes
- ☐ Mine Machine Ropes
- ☐ Winch Ropes
- ☐ Crab Motor Ropes
- ☐ 18 x 7 Hoist Ropes
- ☐ Strip Shovel Ropes

FIRM NAME .....

BY .....

ADDRESS .....

CITY ..... STATE .....

For greater safety ... efficiency ... and economy

U·S·S STEEL MINE TIMBERS

Permits 60% larger single cuttings

By supporting room ceilings with U·S·S Steel Mine Timbers, you can get at least 60% larger single cuttings. These strong steel beams are a full 20 feet in length, only 3⅞ inches deep and weigh about one-third as much as wood slabs normally used for 12′ rooms. They give more working room for your machines . . . more head room, greater safety for your men . . . enabling you to get a greater return on machinery investment and man-hours of labor.

Reduces haulageway maintenance

The direct-hitch, pin-and-stringer or modified stringer methods of steel timbering—without legs or posts—provide permanent, safe protection for haulageways at a substantial reduction in costs of installation as compared with other recognized methods. Lost time, accidents, lost production and attendant labor and material costs caused by derailment are minimized. And the hazard of falling timber, lagging and roof due to knocked-out posts or legs is eliminated.

BECAUSE steel mine timbers are balanced sections with definite uniform sectional properties as compared with the irregular profile and indefinite sectional properties of wood beams, they are the safest, most efficient mine supports you can use.

Being lighter for equivalent strength, they require less labor to handle. They will not break, split or rot. And because steel timbers can be used over and over again, and when finally discarded have a high scrap value, they become more economical than ever.

Plan now to make your mine more efficient by making it safer with U·S·S Steel Mine Timbers. An inquiry will bring helpful information . . . promptly and without obligation.

USS STEEL — UNITED STATES STEEL

CARNEGIE-ILLINOIS STEEL CORPORATION

Pittsburgh and Chicago

Columbia Steel Company, San Francisco, *Pacific Coast Distributors*

United States Steel Export Company, New York

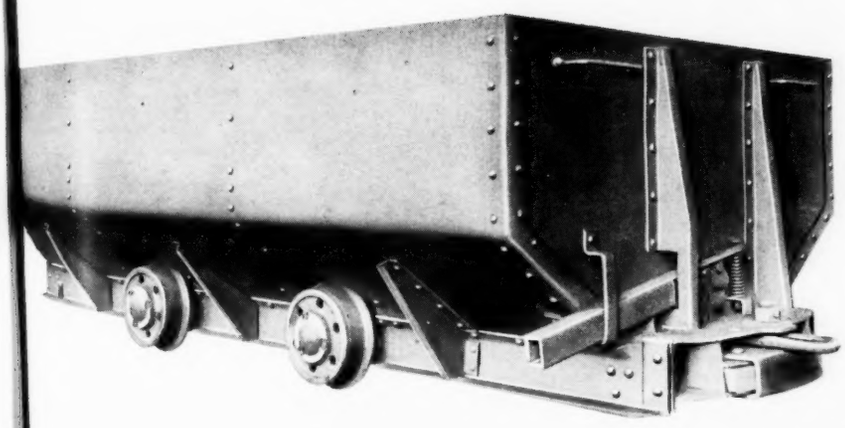
7-85

UNITED STATES STEEL

Automatically

unlatched, dumped and latched in 5 seconds!

Seems Remarkably F-A-S-T! Doesn't it?



Actual timing has shown that when dumping a 16-car trip of A.C.F. Drop-Bottom mine cars—"only 80 seconds elapse" from the time the first car is unlatched until the last car is latched. Automatically, of course! Meanwhile, as much as 80 tons of coal has been unloaded into the storage hopper. "A ton per second, unloading time!" Cars are returned to the mine immediately—saving precious minutes of loading time!

Such speed in dumping will certainly increase your daily output and lower your transportation costs! Why not investigate the possibilities of using A.C.F. Drop-Bottom mine cars in your mine?

Our Sales Representatives will be glad to discuss Drop-Bottom cars with you. Get in touch with our nearest Sales Office.

MERICAN CAR AND FOUNDRY COMPANY

NEW YORK • CHICAGO • ST LOUIS • HUNTINGTON, W. VA.
CLEVELAND • PHILADELPHIA • BERWICK, PA. • PITTSBURGH

a.C.f.

You See at Once That the SIDE of a V-BELT

is the part that GETS the WEAR

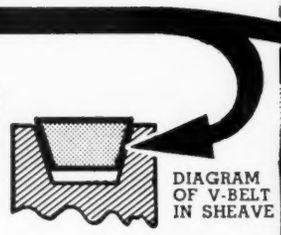
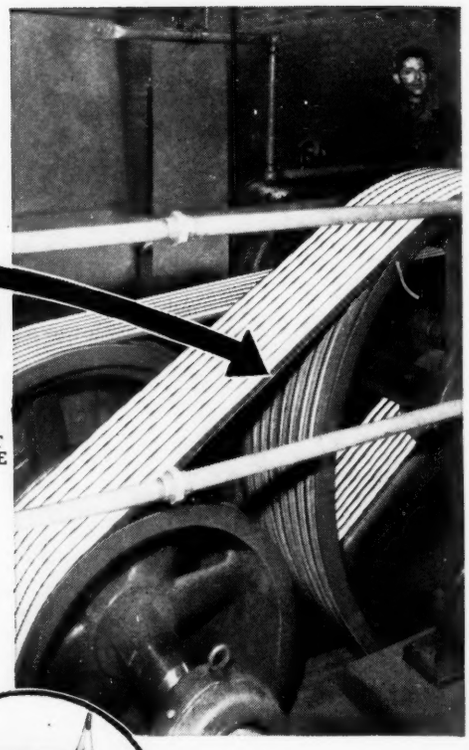


DIAGRAM OF V-BELT IN SHEAVE



Naturally so, because the sides of a V-belt do all the gripping on the pulley. They get all the wear against the sheave groove wall.

It's the sides, too, that pick up all the power delivered by the driver pulley. The sides transmit that power to the belt as a whole. And then, once more, it's the sides--and the sides alone--that grip the driven pulley and deliver the power to it.

That is why you have always noticed that the sidewall of the ordinary V-Belt is the part that wears out first.

---and Now See How the CONCAVE SIDE

(A GATES PATENT)

✓ REDUCES Sidewall WEAR

Greatly Lengthening Belt Life!

Clearly, since the sidewall is the part that wears out first, anything that prolongs the life of the sidewall will lengthen the life of the belt.

The simple diagrams on the right show exactly why the ordinary, straight-sided V-Belt gets excessive wear along the middle of the sides. They show also why the Patented Concave Side greatly reduces sidewall wear in Gates Vulco Ropes. That is the simple reason why your Gates Vulco Ropes are giving you so much longer service than any straight-sided V-Belts can possibly give.

✓MORE Important NOW Than ever Before!

Now that Gates Specialized Research has resulted in V-Belts having much stronger tension members -- tension members of Rayon Cords and Flexible Steel Cables, among others--the sidewall of the belt is often called upon to transmit to the pulley much heavier loads. Naturally, with heavier loading on the sidewall the life-prolonging Concave Side is more important today than ever before!

THE GATES RUBBER COMPANY, DENVER, U. S. A.
World's Largest Makers of V-Belts

Straight Sided V-Belt

How Straight Sided V-Belt Bulges When Bending Around Its Pulley

You can actually feel the bulging of a straight-sided V-Belt by holding the sides between your finger and thumb and then bending the belt. Naturally, this bulging produces excessive wear along the middle of the sidewall as indicated by arrows.

Gates V-Belt with Patented Concave Sidewall

Showing How Concave Side of Gates V-Belt Straightens to Make Perfect Fit in Sheave Groove When Belt Is Bending Over Pulley

No Bulging against the sides of the sheave groove means that sidewall wear is evenly distributed over the full width of the sidewall—and that means much longer life for the belt!

472

GATES VULCO ROPE DRIVES

Engineering Offices and Jobber Stocks **IN ALL INDUSTRIAL CENTERS** of the U. S. and 71 Foreign Countries

Gates — THE MARK OF SPECIALIZED RESEARCH

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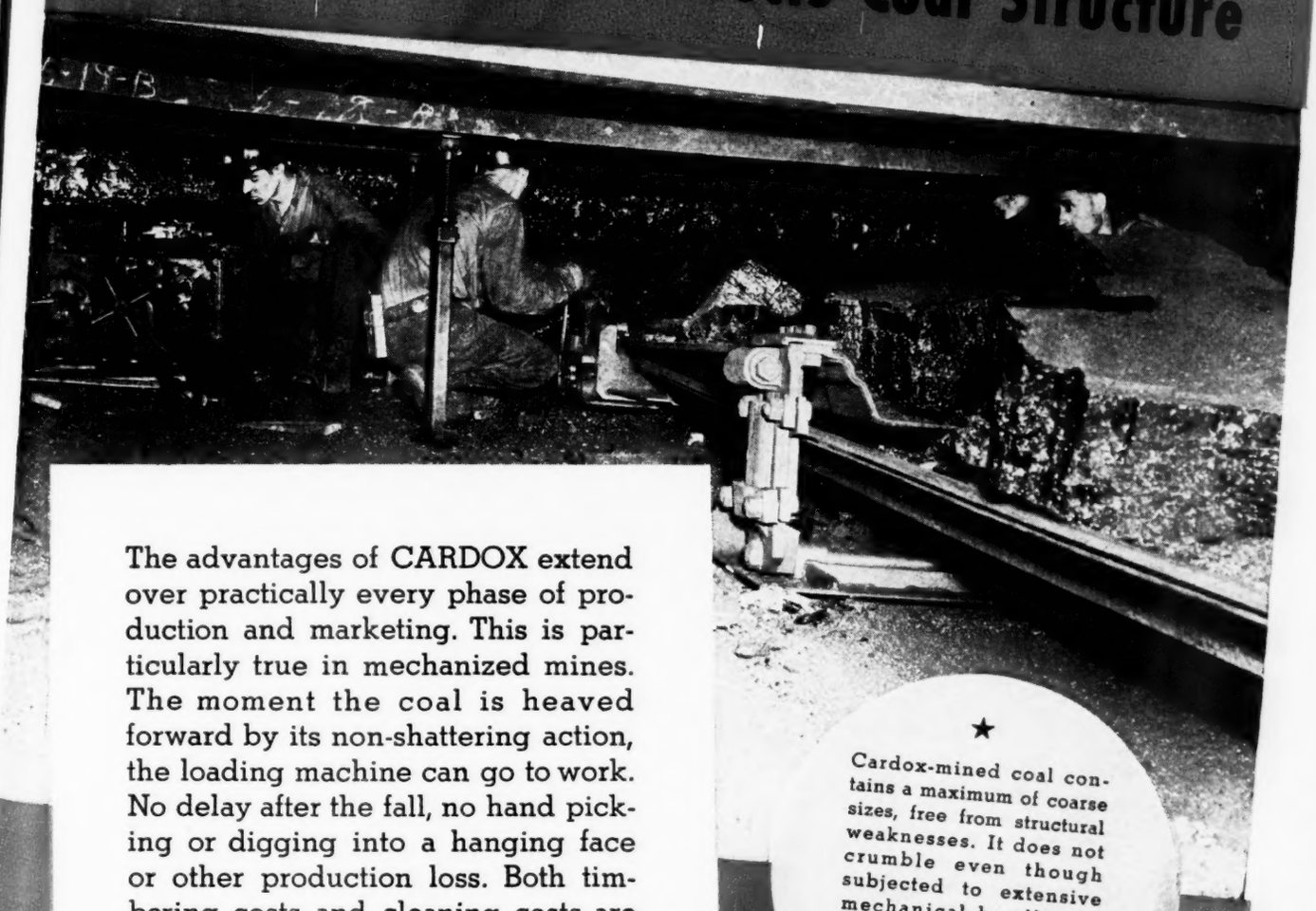

The advantages of CARDOX extend over practically every phase of production and marketing. This is particularly true in mechanized mines. The moment the coal is heaved forward by its non-shattering action, the loading machine can go to work. No delay after the fall, no hand picking or digging into a hanging face or other production loss. Both timbering costs and cleaning costs are reduced.

Write for full details on free demonstration of CARDOX production economies and marketing advantages.

★

Cardox-mined coal contains a maximum of coarse sizes, free from structural weaknesses. It does not crumble even though subjected to extensive mechanical handling—retains its premium size as received and re-delivered by the dealer.

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no other DRAGLINE BUCKET . . . . . gives you this combination of advantages!

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EASIER SPOTTING

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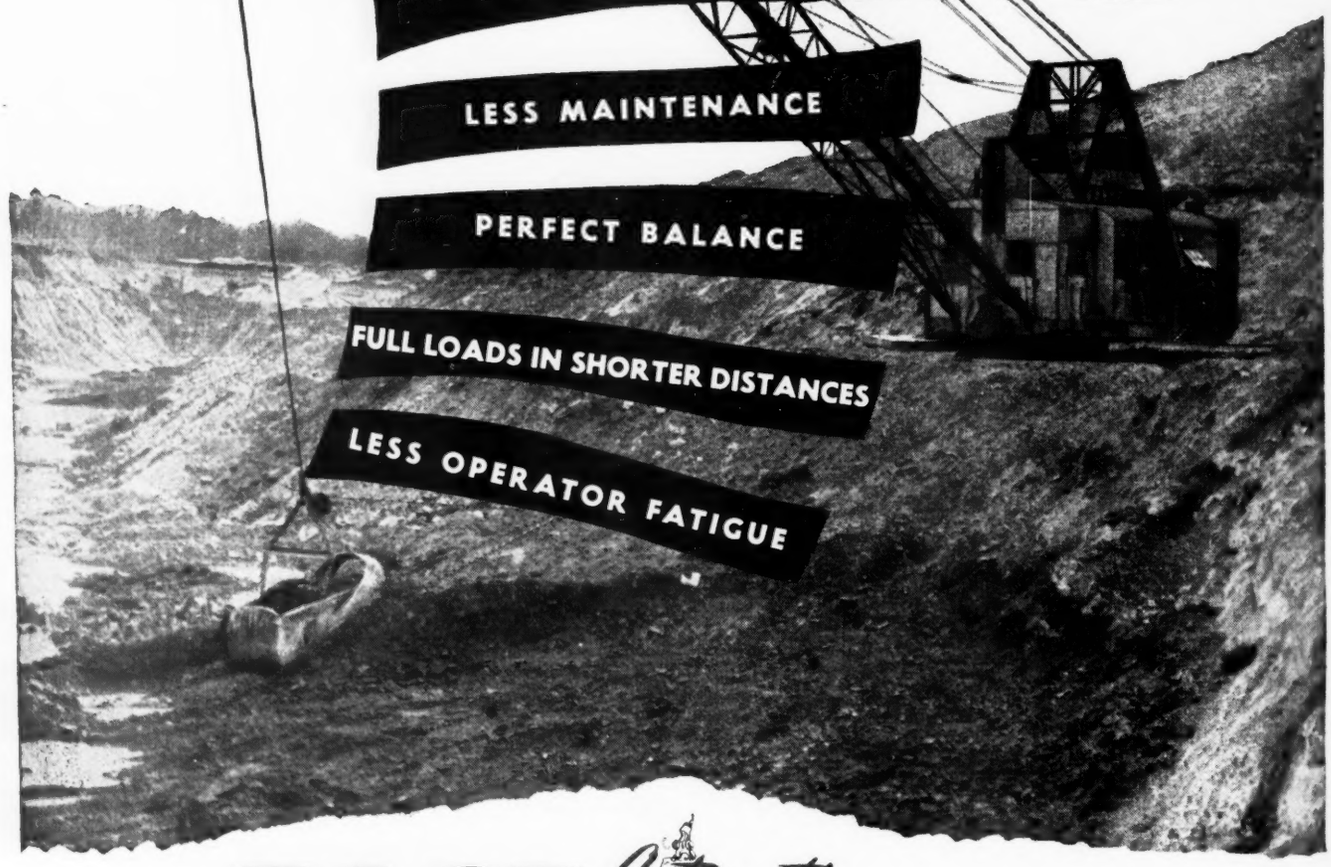
PERFECT BALANCE

FULL LOADS IN SHORTER DISTANCES

LESS OPERATOR FATIGUE

New Page Reversible Center Shank Tooth Points These new Page Manganese tooth points will stay absolutely tight on the lip because the new hook bolt fastening prevents wearing and tearing of the bolt and also allows quick and easy replacement.



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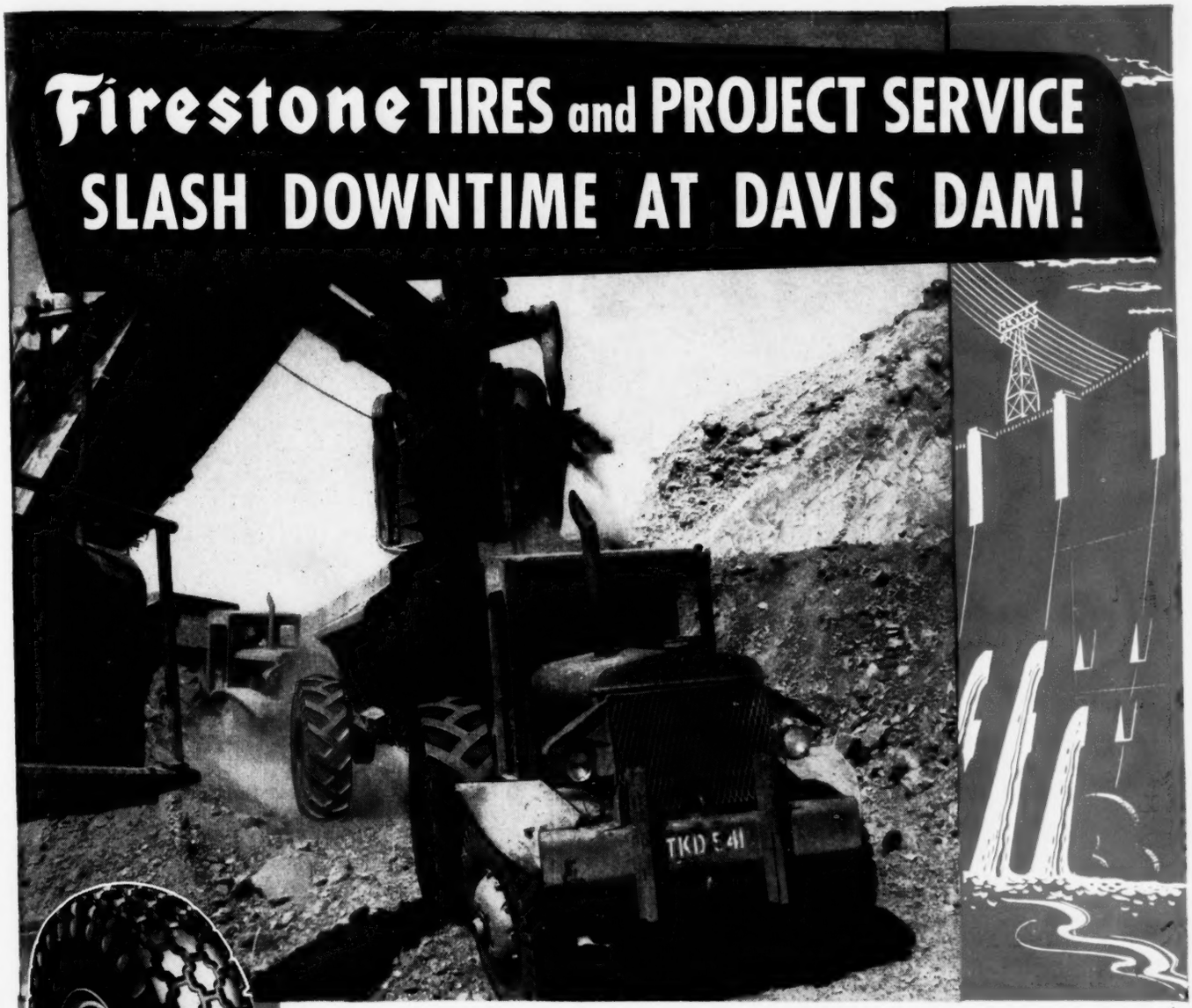
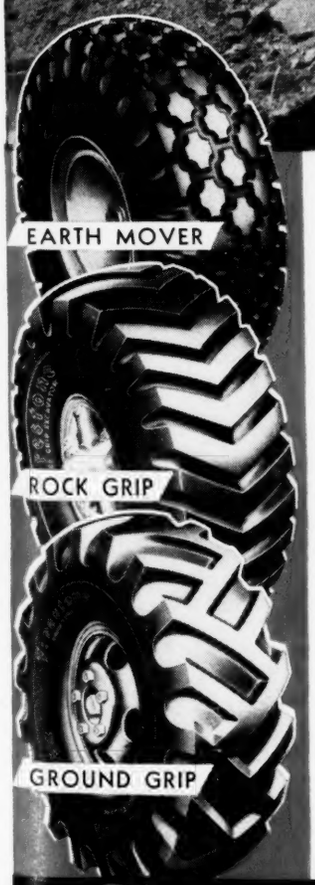
CHICAGO 38, ILLINOIS

a size for every job . . . . . 3/8 yd. to 35 cu. yd. and larger

Firestone TIRES and PROJECT SERVICE SLASH DOWNTIME AT DAVIS DAM!





AT THE Davis damsite, Firestone Off-the-Highway tires and project service are writing a great new chapter in earth-moving history. Downtime, due to tire failure, has been virtually eliminated!

Utah Construction Company, operating company in the building of this huge earth and rockfill dam, has turned over to Firestone Dealer, Bailey, Inc., sole responsibility for the supplying and maintenance of all tires on the project. This equipment operates 24 hours a day over some of the roughest and hottest terrain in the country. Records show that downtime on dump trucks, scrapers, road patrols, tractors, trucks and trailers has been slashed to the vanishing point.

These same Firestone Off-the-Highway tires, and technical knowledge and project service are available to you in every part of the country. For complete information consult your nearest Firestone Dealer or Firestone Store.

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Firestone OFF-THE-HIGHWAY TIRES

Figure it out for Yourself!

You don't need a sharp pointed pencil to figure the time-saving, cost-reducing advantages of Willison Automatic Couplers. Here's what they give you:

1. Safer operation—coupling and uncoupling without going between cars.
2. Faster handling of large cars.
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4. Less coal spillage.
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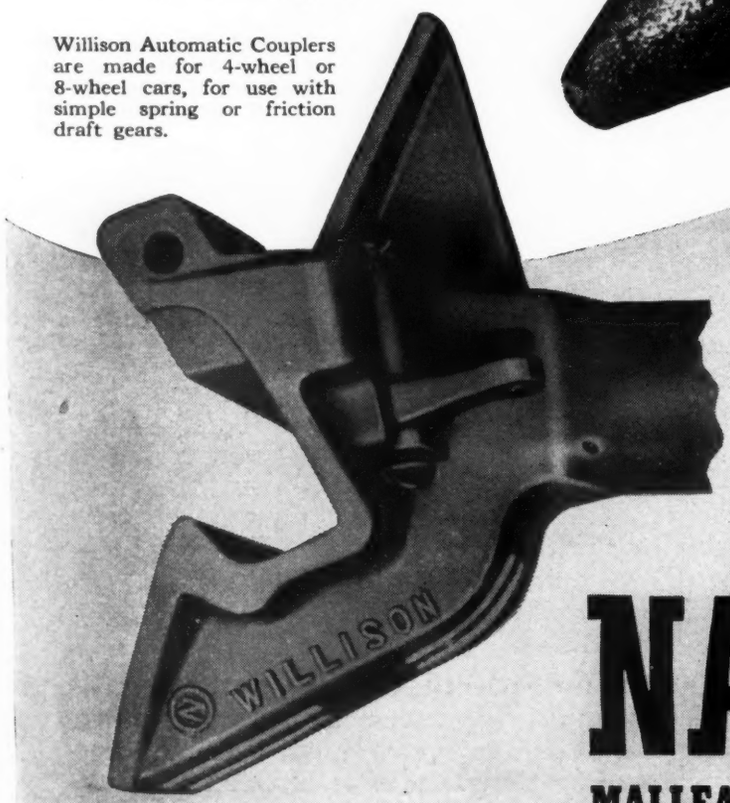
6. No uncoupling on rotary dumps.

These cost-saving features have been proved by leading mine operators. Ask us for details on how you can save time and money with Willison Automatic Couplers.

Willison Automatic Couplers are made for 4-wheel or 8-wheel cars, for use with simple spring or friction draft gears.



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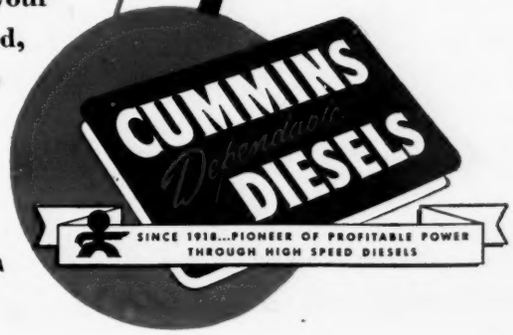
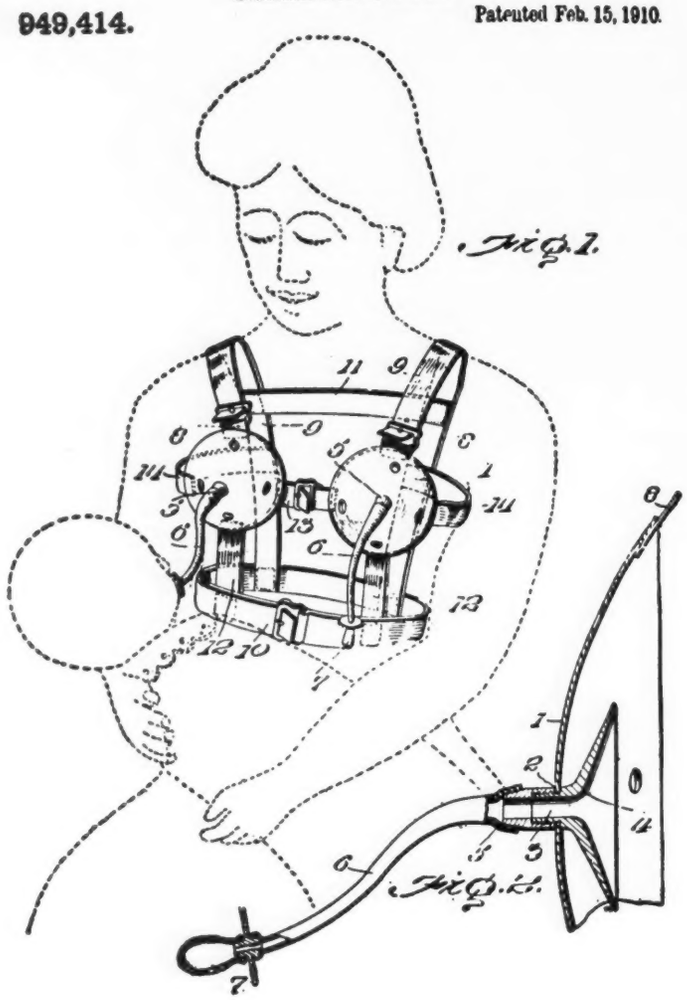


CUMMINS ENGINE COMPANY, INC. • COLUMBUS, INDIANA

"THE MODESTY OF WOMAN"

NURSING ATTACHMENT.
APPLICATION FILED SEPT. 7, 1909.

949,414. Patented Feb. 15, 1910.



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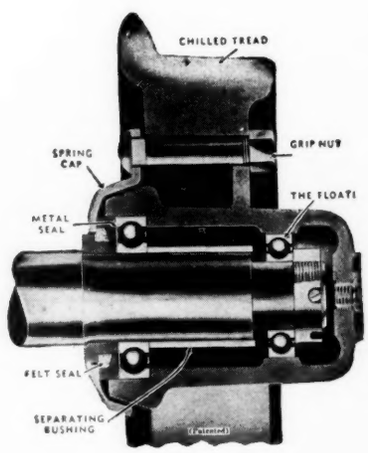
No. 4 OF A SERIES

THE NURSING ATTACHMENT

"The primary object of this invention is an improved construction of device for use by mothers with nursing infants, and designed particularly to avoid unpleasant and embarrassing situations in which mothers are sometimes placed in public places by the necessary exposure of the breast in suckling the child."

(Language inside quote marks taken directly from U. S. Patent.)

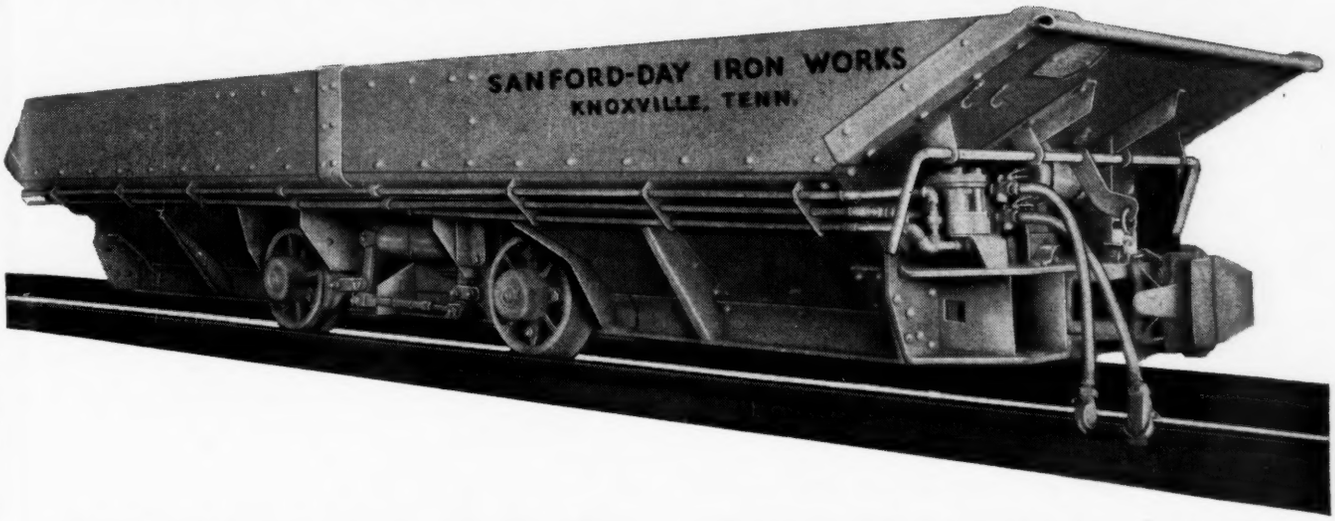


Are you "nursing" the wheels on your cars—feeding them grease and oil every week? You can limit your greasing to once in five years with S-D Floater Ball Bearing Wheels . . . we guarantee it. In addition we guarantee "Floaters" against breakage or undue wear for 5 years, also against bearing failure. The low cost of operation of "Floaters" is worth investigating.

"WE LIKE TO MAKE SHIPMENTS LIKE THIS

Sanford-Day Iron Works, Knoxville 9, Tennessee

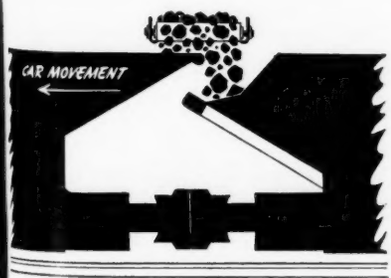
HERE'S A HUMDINGER!



This S-D Automatic Bottom Dumping Mine Car has sides measuring 16 Ft. 7⅜ In. at top edge. The length over bumpers is 18 Ft. 4 In. —maximum car width 6 Ft.—height above rail 38 In.—track gauge 42 In.—capacity, with 6 In. surcharge, 256.5 Cu. Ft.

This car has the modern automatic doors with the automatic, under-the-car, unlatching device—no latch levers on end of car to give trouble—two latch hooks—one for safety—Westinghouse air brakes—overlapping ends for conveyor loading—Wilson automatic couplers —S-D Floater Ball Bearing demountable wheels. If you want to know what a wonderful job this particular car is doing in actual service, write us and we will give you the name and address of the user.

Official records prove the S-D "Automatic" reduces costs of coal per ton from 20 to 50 cents as compared to either rotary or end-dump cars formerly used by mines and thrown away and scrapped for installation of S-D "Automatics". Wouldn't it tickle you to save this much on the cost of your coal? If you will write us we will go into the matter, at once, in detail. Read the next paragraph and you will see how you can make this saving per ton with practically no cash outlay on your part.



This sketch illustrates the use of overlapping ends of car for continuous loading by conveyor.

AN OUTLINE OF OUR LEASING PLAN

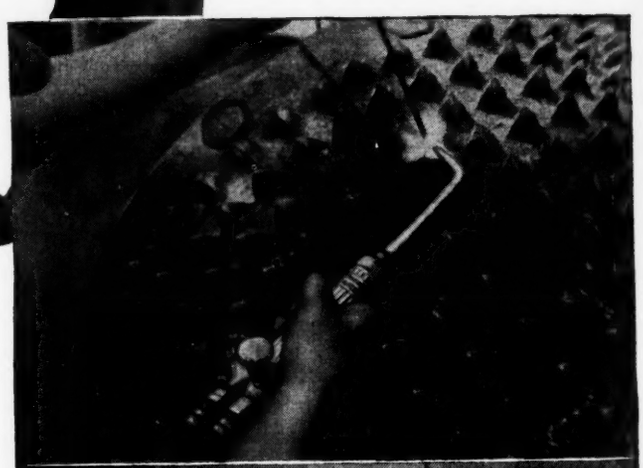
It will cost you, to lease S-D "Automatics", only about 2 cents per ton of coal hauled over a 15 year period. You pocket somewhere between 20 and 50 cents per ton savings. Your cash outlay is for freight on cars and storage bin. We furnish free repair parts during life of lease to replace ordinary wear and tear. At any time, you can buy the cars at a price that constantly reduces as you pay rents. This is a wonderful proposition for you. There is no chance for you to lose. Today, hundreds of thousands of dollars worth of cars are under lease and we will furnish you with the names and addresses of lessees upon request. We hope you are next on the list of lessee money makers.

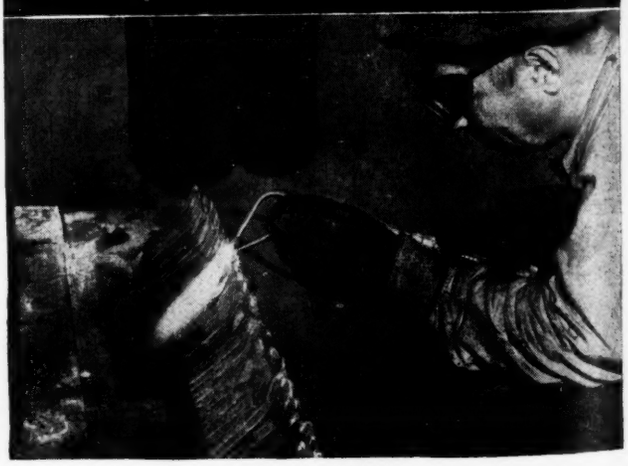
E THIS ON MONDAYS, WEDNESDAYS AND FRIDAYS"

Sanford-Day Iron Works, Knoxville 9, Tennessee

LOW COST...EFFICIENT MAINTENANCE

of Wearing Parts by Hardfacing





Worn mining machinery and equipment need no longer mean costly replacement. Today, coal men have found that rebuilding worn surfaces with the oxyacetylene flame or electric arc using Stoody Hardfacing Alloys renews the life of their equipment, and in many cases, improves the operating characteristics.

For example, they have found that hardfaced shovel teeth last two to six times longer than untreated teeth. Also, as one company reported, by building up worn crusher teeth they saved 75% of the replacement cost of a new segment — which, in turn, was a tremendous saving over the cost of the entire crusher.

But this is just one of the many profitable Airco oxyacetylene flame and electric arc applications in and around the mines. Others include gas cutting steel plate for fabricating screens, slate buckets, and other equipment . . . welding of rail ends to form one continuous rail . . . flame hardening . . . and numerous repair jobs.

For further information about these cost-cutting, time-saving processes write for the explanatory article — "Welding, Flame Cutting For Efficient Maintenance and Low Cost". Address: Air Reduction, 60 East 42nd Street, New York 17, N. Y. In Texas: Magnolia Airco Gas Products Company, Houston 1, Texas. Represented Internationally by Airco Export Corporation.

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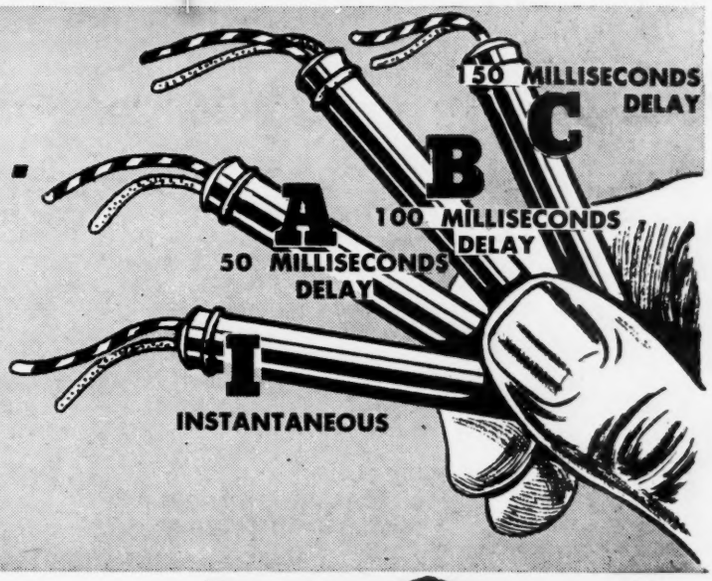
Cr-r-rump....

instead of

BANG!

minimum VIBRATION
better BREAKAGE



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ELECTRIC
BLASTING CAPS

AMERICAN CYANAMID COMPANY
EXPLOSIVES

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In representative operations this blasting device has minimized vibration complaints and given better breakage at reduced cost.

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PAINT A BRIGHT FUTURE FOR YOUR MINES

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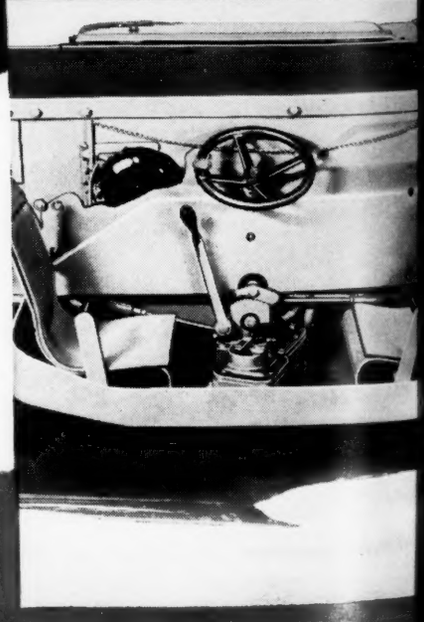
JOY

COAL MINING EQUIPMENT



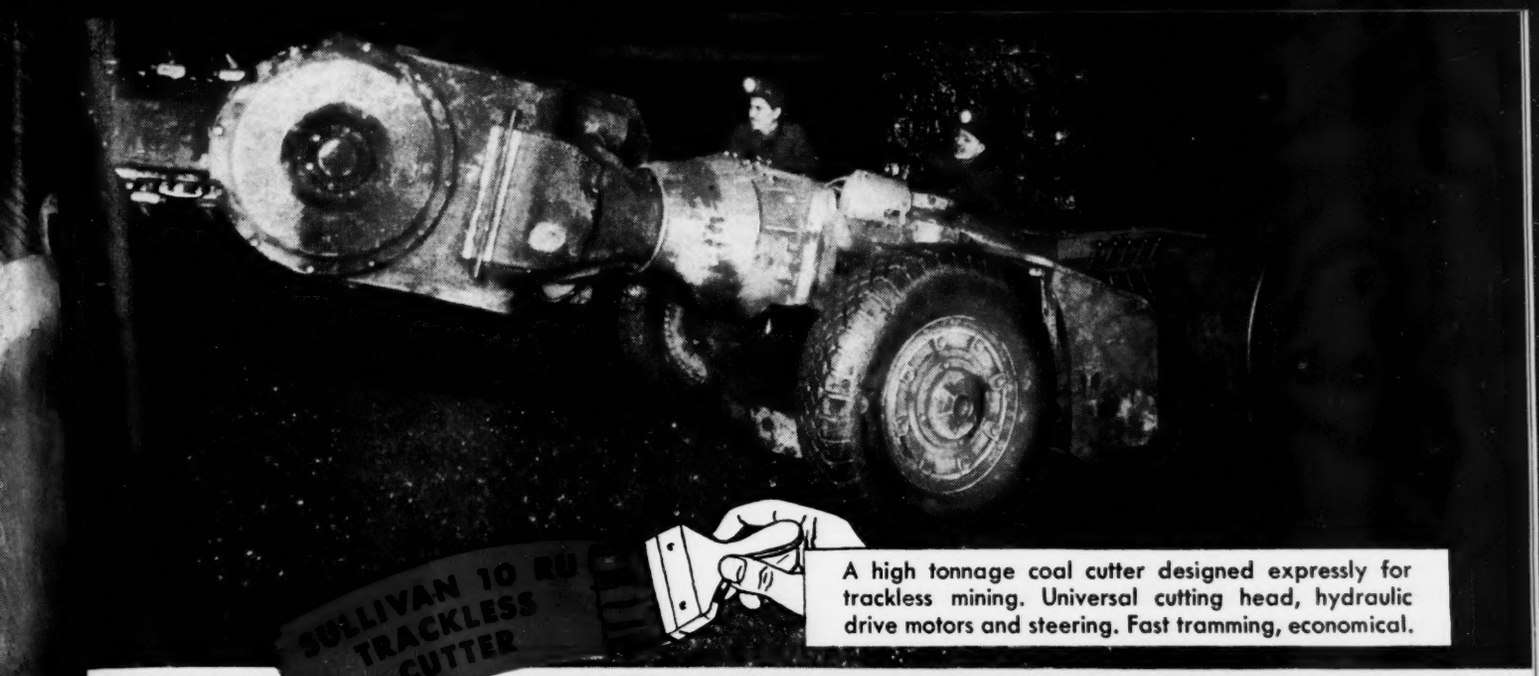
The trend is to JOY

for increased production and lower costs

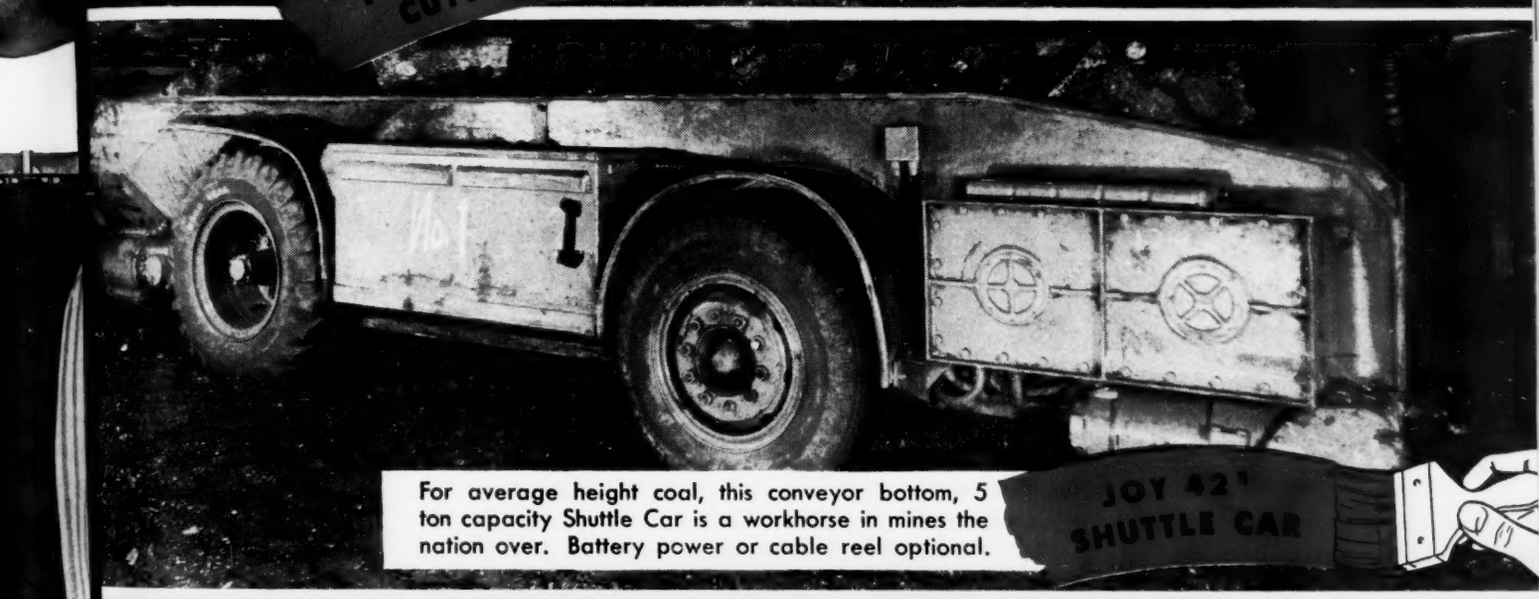
"The World's Most Complete Line of Modern Mining Equipment"

HYDRAULIC STEERING, 4-WHEEL DRIVE
JOY SHUTTLE CARS
turn sharp corners easily

The 4-wheel drive and 4-wheel hydraulic steering optional on Joy Shuttle Cars makes operation simple, takes sharp corners in narrow room entries easily. Fingertip controls are reversible; also, battery or cable reel power for many models.



A high tonnage coal cutter designed expressly for trackless mining. Universal cutting head, hydraulic drive motors and steering. Fast tramming, economical.



For average height coal, this conveyor bottom, 5 ton capacity Shuttle Car is a workhorse in mines the nation over. Battery power or cable reel optional.

Maintains high production loading rates with utmost economy. An extremely mobile, easy to operate team-mate for Sullivan Cutters and Joy Shuttle Cars.

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General Offices: Henry W. Oliver Building, Pittsburgh, Pa.

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There's good reason for this. PRIMACORD actually gets you down to the coal faster. You can plan shot-rotation to give you split-second relief of burden — a feature all-important in fields where overburden is thick and tough. And because every cartridge detonated by PRIMACORD "goes" with the extra power of a primer cartridge, you get full value from your explosives where it's needed most.

PRIMACORD saves you valuable time, too. Loading is simplified — you hook-up quickly with easily inspected square knots and half-hitches. And PRIMACORD'S relatively light weight makes for faster handling in the field.

So — to efficiently remove overburden and help reduce overhead, hook-up with PRIMACORD. Not sensitive to stray electrical currents . . . easy to load and handle . . . it's a real coal-getter!

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THE ENSIGN-BICKFORD COMPANY • Simsbury, Connecticut

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Detonating FUSE

Also ENSIGN-BICKFORD SAFETY FUSE Since 1836

DEVOTED TO THE OPERATING, TECHNICAL AND BUSINESS PROBLEMS OF THE COAL-MINING INDUSTRY

Coal Age

FEBRUARY, 1947

Ivan A. Given, EDITOR

Better Than Fair

WITH ALL INDUSTRY, coal lost some opportunities in 1946, although the blow fell heaviest on bituminous. But if anthracite had had the benefit of more will to produce on the part of employees, and had not had a short general and several local stoppages, there is little question but that production would have been appreciably higher. In bituminous, strikes not only at the mines but in consuming industries cost it heavily in tonnage and put more strain on its ability to meet competition. Some have put the permanent loss of business from these work stoppages and consequent public reaction at better than 20,000,000 tons annually.

What the future holds still is somewhat speculative but there is ground for hoping that the events of 1946 mark the beginning of a new era in labor relations. They certainly highlighted the fact that they are a key factor not only in industry affairs but in government and public relations. Combined with the thinking of the miner, as brought out in the *Coal Age* poll last December, they also highlight the opportunities available to the industry and to individual companies for getting together with employees on a better basis. The industry has made progress, perhaps not so much in practical application as in knowledge, and that progress is a sound foundation for building the cooperation so necessary for peace and mutual effort in the future. The importance of this phase of mining and the possible rewards of intensified effort certainly put labor relations at the top of the list in industry activities.

Like labor relations and in part influenced by them, competition remained another major coal problem. The pressure increased in 1946 against both anthracite and bituminous, as evidenced by such things as diesel encroachments in the railroad field and natural gas and oil in the domestic field. Strikes and controversy, especially in bituminous, boosted—at least temporarily—the rate of conversion, with higher cost an added factor. But increased pressure on research and merchandising brought hopes of improvement, although there was evidence that broader, more widely supported programs would speed the process. That added support and more personal participation should be another big item on the coal agenda, along with intensified industry and company participation in public relations.

Progress was perhaps easier to measure in cost reduction, quality improvement and safety in 1946—and it was real progress. In one direction, it included a tightening up of stripping practice. In underground operation, attempts to develop new or more efficient machines, as well as machines for use in places where present types are impracticable, received added impetus and met with some real success. Equally significant progress was made in the mechanizing of certain auxiliary operations, as reflected in such steps as the widespread adoption of timbering machines. The capacity of mechanical-cleaning installations was stepped up sharply last year and preparation of the fine sizes received greater attention. Past safety work resulted in a new industry record in 1946 and the stage was set for further advances in the future, particularly if greater employee participation—now largely the missing link—can be obtained.

Coal, as pointed out, still has problems to solve, although this in no way belittles its past achievments. But it has the prospect of real help in the form of continued heavy demand for some time to come, in addition to stepped-up efforts of its own. Anthracite in 1947 certainly should do better than in 1946, assuming no work stoppages and continuation of the present high level of industrial activity. Bituminous production may well exceed present forecasts of 560,000,000 to 575,000,000 tons this year if all goes well. Also, the prospects, as far as can be foreseen at this time, are good for 1948. By intensifying work already under way in labor relations, cost reduction, quality improvement, better utilization, merchandising and public relations, coal can really help itself cash in on these prospects in full measure.

BITUMINOUS PROGRESS
Involves Labor and Cost Problems

PRODUCTION AND COMPETITION

Strikes cut 1946 output and result in seizure. Research and merchandising intensified to meet stiffer competition. Heavy production forecast for 1947.

THREE WORK STOPPAGES, federal seizure (still effective at the year's end), the Krug-Lewis agreement, off-again-on-again price and distribution controls, up-and-down industrial needs that veered with strikes in other industries and the approach of peacetime free competition made 1946 a turbulent year for bituminous coal.

But if there were reasons for discouragement in 1946, hope could be built on an about-face in the government's labor policy and on the coal industry's action to pull itself out of its troubles by a speed-up in research, new machinery for merchandizing and a firm resolve, by part of the industry at least, to re-examine its shortcomings and find its way out of the woods.

Production for the year is estimated at 532,000,000 tons, against estimated requirements of 535 to 540,000,000 tons. With an average value of $3.40 a ton, according to an estimate by the Bureau of Mines, total value was $1,808,000,000. Strike-induced losses amounted to about 107,000,000 tons. Shipments of 52,361,722 tons to the upper Great Lakes region failed to meet the 1945 total by about 1,500,000 tons.

As for earnings, the National Coal Association declared that 1946 was less profitable than 1945, when the industry earned some $76,000,000, or 5.4 percent, on gross sales. The drop in 1946 was attributed to a reduction in average days worked from 261 in 1945 to 245 in 1946, the postwar decline in industrial activity and the increase of 65 percent in labor costs since before the war. Railroad car shortages also shared the blame for a shortened work year and reduced earnings.

Highlighted by federal operation of nearly all bituminous mines, government relations and labor relations went hand in hand. A six-weeks stoppage in the spring provoked government seizure on May 22 and produced the Krug-Lewis agreement which, among other benefits, pushed miners' earnings to $1.480 hourly and $61.00 weekly in August, only 1.7c. below the all-time hourly high in June and at the top of the heap in weekly earnings among all industrial workers in August. Yet at the year's end, in spite of a three-weeks stoppage in November and December to force further concessions, Lewis' miners still had not realized all the concessions in the Krug-Lewis agreement. The wage boost was being paid and the Federal Mine Safety code was being used, but the health-and-welfare fund was held in custody of the Navy paymaster-general and foremen unionization was still pending in the courts. In the opinion of operators and many miners, the government-union agreement blocked negotiation of an operator-union contract.

Some Mines Nationalized

Nationalization of the mines, foreshadowed by seizure, became a fact on the last day of the year when by edict the government took over the properties of the Carter Coal Co. for the account and risk of the government and dismissed the owner as manager for the Coal Mines Administration. The Fox Mining Co. was similarly nationalized Jan. 6, 1947.

But if the year was turbulent, there was promise of normality and stability for coal in 1947. The President's action in the railway strike and his determination to cope with Lewis were seen as symptoms of his wish to banish some of the New Deal ghosts. Congress in the spring and summer showed a growing desire to restore independence to business, evidenced in its whittling down of the "Full Employment" bill, its rejection of new minimum-wage legislation, its return of the employment service to the States and

Bituminous Coal and Competition—1945-46

	1945	1946	Percent Change
Bituminous, tons	577,617,327	532,000,000	− 7.9
Crude oil, bbl.	1,711,103,000	1,731,000,000	+ 1.2
Sales and shipments			
Natural gas, M.c.f.	2,149,314,300	2,192,778,000	+ 2.0
Mfg. and mixed gas, M.c.f.	493,849,800	557,885,000	+12.9
Stokers, Classes I & II	119,079	177,000	+48.9
Residential, residential-boiler and residential-furnace oil-burner units	139,611	485,000	+325.1
Railroad fuel			
Coal, tons	124,219,729	110,000,000	−11.4
Liquid fuel, bbl.	123,948,284	112,000,000	− 9.7
Electric utility fuel			
Coal, tons	74,757,968	72,000,000	− 3.7
Oil, bbl.	19,883,484	36,000,000	+81.1
Gas, M.c.f.	326,321,082	307,000,000	− 5.9

Figures for 1946 preliminary or estimates. Sources include: U. S. Bureau of Mines, American Petroleum Institute, American Gas Association, Department of Commerce, Interstate Commerce Commission and the Federal Power Commission.

Labor relations were bituminous coal's biggest headache in 1946. Strikes provoked government seizure and retention of the mines and, while supported by them, were not too well liked by the miners.

its passage of the Case Bill, though it lacked strength to override the President's veto.

The end of OPA in November, after being trimmed down earlier by Congress, signaled a faster pace for ending wartime controls. Indeed, but for the spring stoppage, SFA would have died as scheduled on April 1. Members of the new Congress, following their election, made outspoken pledges to do something about industrial upheavals. Finally, the President's proclamation of the end of hostilities on Dec. 31 removed the threat of further seizures and apparently assured return of the mines to their owners by June 30, 1947.

Other labor-relations developments of the year included the appointment by the N.C.A. of a director of vocational training and the increasing sale of company-owned housing to miners, typified in the following: the New River Co., Mt. Hope, W. Va., 1,000 homes in July; Island Creek Coal Co., 204 homes and lots at Whitman, W. Va., in August; Koppers Coal Division, offering of the entire community of Baxter, W. Va., including the water supply, in September. In all cases, miners were given priority in purchase.

On the whole, there was evidence that operators, union leaders and government officials alike learned something in labor and government relations in 1946. The government's eagerness to plunge into industrial disputes was recognized for what it was—a hindrance rather than a help in reaching industrial peace. Operators and miners realized that they themselves must assume responsibility for solving their problems. In the comments of operators, the acts of Congress and government officials and the opinion of many miners, reflected in *Coal Age*'s opinion survey in December, there was reason to believe that progress was made.

New Coal Rivals

Competition-wise, three new rivals loomed up, in addition to the old contenders, oil and natural gas. One was atomic energy, another was heat from the earth and the third was solar heat from traps made a part of dwelling roofs.

Future production of electricity from atomic energy became a certainty during the year. Equipment and costs, however, were questions yet unanswered, although available opinion indicated that coal need expect little competition for some time to come. At Oak Ridge, Tenn., engineers and physicists collected data in the hope of operating the first pilot plant in 1948. Basic problems yet to be solved are metallurgy and ceramics engineering, heat-transfer media, auxiliary and operating equipment and personnel safety.

Meanwhile, test installations of reverse-cycle heat pumps to draw heat for home comfort from 200-ft. wells or boreholes were made at Chattanooga, Tenn., Salem, N. J., Steubenville and Portsmouth, Ohio, and Berwyn, Ill. Because the system is just the reverse of gas refrigeration, the equipment can be reversed for summertime cooling. In Denver, experiments with a solar-heat trap on the roof of a dwelling (see news section of this issue) were reported to offer a substantial saving in fuel cost.

From its old competitors, coal felt new pressures. By September, after shortages earlier in the year, production of vaporizing-type oil burners reached 1941 levels. Oil interests promised 750,000 burners in 1947 and predicted that the annual market for fuel oil would reach $200,000,000 by the end of the year. Production of crude petroleum in 1946 is estimated at 1,731,000,000 bbl., from which 287,500,000 bbl. of light and 428,000,000 bbl. of heavy oil was derived.

In spite of oil-burner shortages, there were dramatic changeovers from coal to oil. In midsummer, the Union Pacific R.R. announced that with but two exceptions its main-line passenger trains had been converted to oil or diesel operation. In December, the Norfolk & Western Ry. stated that certain coal-burning locomotives, converted during the coal strike, were being set aside permanently "for future emergencies." Typical of many reactions elsewhere to interrupted coal supplies were the news that two florists in Greeley, Colo., had gone to oil and the statement by a Cleveland oil dealer that his 1946 sales were 50 percent above 1945.

Natural-gas sales in 1946 rose 2.0 percent over 1945 to 2,192,778,000 M.c.f. and the industry ended the year with 20,835,000 customers, a gain of 2.7 percent, with largest increases among residential and commercial users. The industry now has 220,000 miles of trunk lines, 4 trillion cubic feet of production annually with a market value of $850,000,000, assets of $4,000,000,000 and proved reserves of 148 trillion cubic feet, enough for 30 years.

Most dramatic natural-gas event of the year was the temporary conversion of the Big Inch pipeline from oil to transport natural-gas to Ohio and Indiana under pressure of the year-end coal strike. Initial deliveries were 50,000,000 cu.ft. daily, gradually increasing to 150,000,000 cu.ft. shortly after the first of 1947. Meanwhile, withdrawal of the Joint Army-Navy Board's objection to use of the lines for gas paved the way for new consideration of their final disposal by the War Assets Administration.

Even so, natural-gas expansion did not keep pace with demand. Typical of the situation in other parts of the nation was the appeal of the Ohio Fuel Gas Co.: "No More Changing to Gas Heat from Other Fuels This Season!" Overtaxed lines were cited as the reason.

In the face of such activity by its competitors, coal men were intensifying their efforts to meet and beat their competition.

Awakened interest in merchandising was registered in Cleveland on March 15, when the N.C.A. launched its nation-wide marketing plan to join

COAL ROUND THE WORLD

In the following **Coal Age** summarizes the production picture in countries where information is available. Where also available, data on prospects and plans are presented. With some few exceptions, the material was gathered by correspondents of the McGraw-Hill World News Bureau. All figures are rounded and in net tons.

Australia—Estimated 1946 output, 14,600,000 tons; 1945, 14,300,000 tons; 1941, 15,900,000 tons.

Canada—Estimated 1946 production, 17,400,000 tons, compared to 16,457,000 tons in 1945. Imports, largely from the U.S., estimated at over 29,000,000 tons, against 24,731,000 tons in 1945. Exports, largely to U.S., less than a million tons. Demand continues strong but supplies are reported adequate if not plentiful at the beginning of 1947.

Czechoslovakia—Black-coal production up 34.4 percent to a monthly average (estimated) of 1,480,000 tons. Brown-coal production, however, was up only 0.7 percent, with production running around 1,700,000 tons monthly.

Belgium—Estimated 1946 production, close to 24,000,000 tons, against 33,000,000 tons in 1939. Belgian production was recovering rapidly from war effects.

China—Production at lowest level in 35 years, approximating 11,000,000 tons in 1946, exclusive of Communist-controlled mines but including Formosa and Manchuria. The 1941 output was reported as 62,000,000 tons. Equipment is being acquired for a major expansion, with the goal as 18,000,000 tons or more in 1947.

France—Good recovery from war effects in 1946 but severe restrictions on use continued. Mines nationalized. Substantial installation of equipment planned for major production increase. Output in 1946 estimated at 54,500,000 tons, against 35,200,000 tons in 1945 and 48,400,000 tons in 1941. Supply situation still complicated by inability to bring imports up to desired level.

Germany—Hard-coal production (present borders) 72,500,000 in 1946 against 45,500,000 in 1945 and about one-third the 1941 figure; brown coal, 177,000,000 tons, against 118,000,000 in 1945 and about two-thirds 1941. Supply critical.

Great Britain—Coal critically short in 1946, forcing conversion to oil and increasing restrictions on use. Mines went into government hands Jan. 1, 1947, for $658,400,000 in bonds. Production in 1946 estimated at 207,000,000 tons, against 204,000,000 tons in 1945 and 231,000,000 tons in 1941. Hoped-for increase in tonnage per man and total output failed to materialize, although a slight improvement marked the early days of 1947. Production, however, was running substantially behind demand, with no immediate prospect that it would catch up.

India—Estimated output in 1946, 32,500,000 tons, same as 1945. Work on expanding production under way in view of substantially increased demand.

Italy—Production in 1946 expected to reach 3,300,000 tons, against 1,600,000 tons in 1945 and 4,900,000 tons in 1941. Italy, a heavy importer, was getting only a fraction of previous requirements from foreign nations.

Japan—Estimated 1946 production, 21,000,000 tons, compared to 32,000,000 in 1945 and 63,000,000 tons in 1941. Nationalization was agitated for but no action was taken in 1946. Supply very short and severe measures were being considered to raise output.

Poland—Production in 1947, including mines acquired from Germany, approximately 51,000,000 tons (about half exported) against 42,000,000 tons in 1938. Goal for 1947, 66,000,000 tons.

Netherlands—Production in 1946 estimated at 9,200,000 tons, against 5,600,000 tons in 1945 and 14,700,000 tons in 1941.

Russia—No specific data available; production reported to be between 190,000,000 and 220,000,000 tons annually at present, against 161,000,000 tons in 1938.

Union of South Africa—Estimated production, 1946, 25,800,000 tons, practically the same as in 1945 and about 5,000,000 tons ahead of 1941.

Spain—No 1946 data yet; 1945, 13,200,000 tons against 10,600,000 tons in 1941.

Turkey—Estimated 1946 output, 4,200,000 tons against 4,100,000 tons in 1945 and 3,320,000 tons in 1941. Active efforts to increase output under way.

producers, wholesalers and retailers in making coal a more satisfactory fuel for home use, with 24-hour emergency service, better deliveries and automatic controls among the goals. The "go-ahead" signal for local retailer groups went out from Washington headquarters on Oct. 14. On Oct. 25, Detroit retailers signed a contract with the N.C.A. setting up the first affiliate of the National Coal Heating Service. Retailers in other areas were coming in in increasing numbers.

Research Pressed

Research was another string to the coal man's bow in 1946. Bituminous Coal Research, Inc., with a budget of $375,000, sped investigations and developments in 40 projects touching on virtually all uses of coal and joined with the Small Homes Council of the University of Illinois in a three-year study of home design for coal heat. With the addition in September of western memberships representing 2,000,000 tons, B.C.R. was supported in 1946 by 250 coal companies and associations, 11 coal-burning railroads, 18 stove manufacturers and three equipment companies.

Affiliated with B.C.R. but separately administered, the Locomotive Development Committee moved toward substantial pilot-plant operation of the new coal-fired gas-turbine locomotive. Orders for two turbo-power units were placed with Allis-Chalmers and the Elliott Co., and joint designs for chassis and running gear were requested from Alco, Baldwin and Lima, locomotive manufacturers. A contract for full-scale testing of combustion and fly-ash removal was made with the Fontana, Calif., plant of the Kaiser Steel Corp. In addition to high efficiency, quick availability and smooth operation, the new-type locomotive is expected to pare fuel costs to one-third of diesel-fuel costs when it reaches full development in 1948.

Liquid Fuel Studied

The U. S. Bureau of Mines, too, sought out new uses and techniques. On Jan. 21, a contract was let for a new Synthetic Fuel Laboratory at Bruceton, Pa., to be completed before 1947 at a cost of $249,000. In April, a nucleus staff was appointed for the new Synthetic Liquid Fuels Laboratory at the University of West Virginia, Morgantown. Pilot-plant operation at Grand Forks, S. D., of an annular metal-alloy retort, producing gas of high hydrogen content with about 330 B.t.u. per cubic foot, also was announced. The oil-shale research and development laboratory at Laramie, Wyo., and the oil-shale demonstration plant at Rifle, Colo., were scheduled for occupancy and operation by the end of the year, and contracts were let for conversion of the surplus synthetic-ammonia plant at Louisiana, Mo., into a coal-hydrogenation and gas-synthesis demonstration plant. In addition, the Bureau got under way with plans for underground gasification of coal at the Gorgas plant of the Alabama Power Co., Birmingham. The upshot of these and other developments was a

Bituminous Highlights of 1946

Jan. 1—Producers' Committee for Smoke Abatement reactivated.

Jan. 25—U.M.W. rejoins A.F.L. after 12-year split.

Jan. 30—British House of Commons approves coal-mine nationalization bill.

Mar. 7—NLRB approves unionization of Jones & Laughlin foremen.

Mar. 12—Joint wage negotiations begin.

Mar. 15—National Coal Association adopts Marketing Committee's report calling for National Coal Heating Service.

Mar. 28—Secretary of the Interior Krug orders coal conservation to meet strike threat.

Apr. 1—Lewis closes bituminous mines. Negotiations break down ten days later.

Apr. 12—Manhattan Project announces plans to produce electricity from atomic energy.

Apr. 29—Joint wage negotiations reopened.

May 7—Residents of St. Paul, Minn., vote eight to one for natural gas.

May 9—American Retail Coal Association approves N.C.A. marketing plan.

May 10—Lewis grants two-weeks truce; miners return to work.

May 22—Government seizes bituminous mines.

May 26—Miners walk out again.

May 28—One-year extension asked for Solid Fuels Administration.

May 29—Krug-Lewis agreement signed with $1.85 a day wage increase, 5c. royalty for welfare fund, Federal Mine Safety Code, increased vacation allowance and provisional organization of foremen. Mines reopened May 31.

June 1—Medical advisor to Coal Mines Administration begins survey of mining towns.

June 21—ICC grants temporary 6 percent freight-rate hike. OPA raises coal prices average of 40½c.

June 30—OPA dies. NLRB reports more than 200 election petitions among mine foremen

July 17—CMA signs contract with Jones & Laughlin foremen.

July 26—OPA reinstated but modified. Ceilings on coal raised to offset temporary freight-rate boost of June 21.

July 29—Federal Mine Safety Code promulgated.

July 30—Deadline for bids on Big and Little Inch pipelines to WAA.

Aug. 19—CMA requests operator-union negotiations beginning Sept. 10. CMA directs U.M.W. to file suit in Jones & Laughlin case. J. Nelson Stuart named manager, Coal Heating Service Division, N.C.A.

Sept. 7—Baruch report to United Nations outlines plans for producing electricity from atomic energy.

Sept. 13—Joint wage negotiations broken off; Southern and Northern operators split.

Sept. 14—N.C.A. announces National Coal Heating Service ready for action.

Sept. 22—Ralph Mulligan named general manager, Bituminous Coal Institute. Transfer of B.C.I. to Washington set for Oct. 1.

Sept. 25—Detroit retailers sign first contract with Coal Heating Service Division.

Oct. 4—U.M.W. convention rejects regional bargaining.

Oct. 15—ICC concludes year-long natural-gas hearings.

Oct. 21—Lewis charges government breaches contract and demands talks on Nov. 1.

Nov. 1—Government meets Lewis for contract talks after strike threat.

Nov. 9—President Truman ends most price controls.

Nov. 14—Lewis rejects Krug's request for 60-day truce for operator-union negotiations.

Nov. 19—WAA rejects all bids for Big Inch pipelines.

Nov. 21—Miners fail to report for work, defying federal injunction.

Nov. 25—Contempt hearings begin against Lewis and U.M.W.

Dec. 4—Federal Judge T. Allan Goldsborough fines U.M.W. $3½ million and Lewis $10,000 for contempt of court.

Dec. 6—ICC grants 17.6 percent freight-rate boost effective Jan. 1, 1947; interim hike of June 21 voided.

Dec. 7—Lewis calls off strike, orders miners to work until Mar. 31. No gains for miners.

Dec. 10—First natural gas delivered through Big Inch pipeline to Ohio under temporary permit.

Dec. 16—Supreme Court agrees to hear U.M.W. appeal Jan. 14. Court of Appeals upholds government contract with Jones & Laughlin foremen.

Dec. 19—Northern and Southern operators split on offer to negotiate. Union Pacific Railroad orders 64 diesel locomotives.

claim by the Bureau that coal and lignite reserves can supplement declining reserves of oil and natural gas for up to 2,000 years.

Industrial research in coal utilization also made forward strides during the year. For example, Hydrocarbon Research, Inc., New York City, contended that its adaptation of the Fischer-Tropsch process could reduce the cost of oil from coal to 6.5c. per gallon and bring the cost of gas in cities like New York below the cost of natural gas. At the annual meeting of the A.S.M.E. in December, a new-type horizontal cyclone burner was described that uses low-grade coal with low-fusion-point ash. More than 80 percent of the ash is removed as molten slag, so that clean gases pass over the heat-absorbing surfaces and stack gases are cleaner.

Smoke Problem Tackled

Coal was active also in meeting the challenge of cleanliness. The Coal Producers' Committee for Smoke Abatement, reactivated at the first of the year, assisted in smoke surveys in more than 60 towns and cities. Remedial measures were taken or suggested in such widely scattered places as Cleveland, Minneapolis, East St. Louis, Pittsburgh and Asheville. In November, the Chicago Association of Commerce distributed 100,000 fact sheets showing how to fire home furnaces with a minimum of smoke. In Pittsburgh, the Pittsburgh Consolidated Coal Co. ran full-page advertisements declaring, "We Agree. . . Smoke Must Go!" and offering engineering services to commercial and industrial firms.

Though public opinion of coal suffered because of the year's stoppages, yet the solid achievements of the Bituminous Coal Institute bore fruit in press comment that was better informed than ever before, especially during the year-end strike. The result was a minimum of damage to the industry's public relations. The history of B.C.I. itself was marked by enlargement of the staff and removal from New York City to Washington.

Prospects Better

While bad spots remained in the coal picture, largely as a result of government interference in labor relations, bituminous coal could look forward as it went into 1947 to substantially higher production in at least the next year or so and to a better position as a result of the work in mining, preparation, safety, labor relations, research, merchandising and public relations.

If present government plans are carried out, exports in 1947 should exceed 30,000,000 tons. In addition, stock piles have not reached the peak some expect. These factors, plus the heavy demand expected from industrial and home users, lend weight to forecasts of production of 560,000,000 to 575,000,000 tons, or more, in 1947. With the falling off in exports to be expected eventually, plus completion of stock rebuilding, as well as a decline in industrial demand when war-induced shortages are relieved, the pressure on production will ease, but all the evidence indicates that it will be at least 1950 before coal can expect an appreciable lessening in demand, assuming there were no other developments that would keep the pressure on.

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MINING AND PREPARATION

Mechanical-loading and strip percentages up again. Deep mines mechanizing auxiliary operations. Heavy additions made to mechanical-cleaning capacity. Preparation of fines stressed.

ANOTHER increase in the percentage of underground tonnage loaded mechanically, paralleled by another rise in stripping percentage, paced developments in bituminous mining and preparation in 1946. The capacity of mechanical-cleaning installations was marked by another substantial increase, with increasing emphasis on the treatment of the finer sizes as the year progressed.

The year 1946 also was marked by increased interest in the development of a practical mining and loading machine, or machines, and this was expected to bring about a formal study of the problems in the near future by manufacturers and the industry. In stripping, preliminary estimates put the percentage of the total tonnage in 1946 at 20.5, compared to 19.0 in 1945.

Sales of mechanical loaders (see p. 89) reached 495 in 1946—a new high, with all but five going into bituminous mines. The 1945 total was 359. Sales of conveyors also increased to 1,157 in 1946, compared to 866 in 1945. Nearly 800 of the 1946 total went to bituminous. Along with work designed to increase capacity and make loaders easier to use, manufacturers intensified efforts to develop new and better equipment for the thinner seams—in which an increasing number of machines are being installed. The power duckbill, for example, went into additional properties in 1946 and work on improving it was reflected in a substantial increase in performance. A few mines were added to the list of those who have or are using the saw-toothed loaders—a shaker pan flattened on one side and edged with a serrated bar. It is placed under the cut and the coal is shot down on it, after which it is jacked or barred across the face. Plain face pans also designed for use under the cut also were used with satisfaction in some mines.

Loaders Set High Mark

New developments in loading machines also included completion of the first conveyor loaders of a new type. This machine, mounted on rubber tires and with its front wheels on controlled swivels, operates with the rear conveyor held stationary over the room conveyor by an automatic hydraulic roof jack. Increase in rubber-tired haulage also was reflected in an increase in the number of crawler-mounted loaders being successfully operated in seams pitching 10 to 15 percent.

The year 1946 found better understanding of principles and more success in putting them into practice resulting in substantial increases in machine and individual tonnages. The record for the year apparently was set by a 20-man crew on Sept. 16. Using one loading machine with four shuttle cars, this crew produced 1,402 tons in one shift. Records of 1,000 to 1,200 tons per shift were frequent, and the average output per machine-shift was better than 500 to 600 tons at an increasing number of properties—some in rather low coal.

Increased productivity, not only in loading-machine but also conveyor mines, was, as indicated, an outgrowth of work in many phases all the way from better ventilation to new equipment. Revised mining plans therefore

played a part, with increasing emphasis on more coal per place and, usually, more places per territory. Contrariwise, a number of operators using loading machines reported better results with as few as two places and reduced crew sizes. The year 1946 also was marked by additional decisions to develop mines and working territories to fit an efficient prefabricated track layout or other predetermined haulage system. Results indicate that these plans provide a major tonnage increase.

Intensified work on other auxiliary equipment and activities also was playing a significant part in raising loader and conveyor tonnage, as well as individual productivity. In the field of timbering, several mines were saving time and promoting safety in the face zone by using pins in drill holes to facilitate installation of crossbars. One company (January, 1947, *Coal Age*) reported that putting the pins down near the bottom and using them as supports for jacks was providing additional advantages.

New timbering machines of the crawler, rubber-tired or track types proved their ability to cut cost and promote safety in 1946. In one case, track-mounted units (see p. 102 of this issue) permitted reducing the number of men per crew engaged in timbering from four to two. Another company, which developed a rubber-tired unit for both thick and thin coal, reports that timbermen per crew have been reduced from five to three. An article on this unit will appear in an early issue of *Coal Age*. A machine developed at another mine includes a hydraulically powered auxiliary boom on one side for lifting and standing legs in addition to the regular boom for raising and holding crossbars. All users of timbering machines report not only greater safety for all crew men but fewer injuries in the timbering itself.

Cutters, Drills Improved

Cutting and drilling was marked by additional use of high-capacity mounted units, including crawler and rubber-tired models in trackless mining. Power swinging and positioning of booms on mounted drilling machines made headway during the year and proved its ability to achieve substantial cost reductions. Adoption of power at one operation, for example, permitted a reduction of one man per loader crew. This installation will be described in an early issue of *Coal Age*. Use of special cutting and drilling bits increased, with recent types embodying special alloy inserts making substantial gains because of greatly increased footage with the same labor, plus other advantages.

Mechanization of auxiliary operations made major strides in deep mines in 1946. Shown here is a coal-company timbering machine, one of a number of designs installed last year.

Increased use of prefabricated track, as previously noted, was one of the features of 1946. Big modern cars with anti-friction bearings, automatic couplers and other features were put into use at many additional mines. An increasing proportion were of the solid rotary-dump or drop-bottom types, with eight-wheeled models showing a gain. Rotary-dump and bin installations consequently increased. Where shafts are employed, several were converted to skips. In other cases, facilities on the bottom were improved by installing automatic cagers and improved feeders and trip makers. Locomotive installations included one 25-tonner motored up to 19 hp. per ton to enable it to operate at 11.5 m.p.h. fully loaded. Features include eight-wheeled swiveling trucks, one motor per truck or 480 hp. in all.

Where possible, new mines in 1946 were opened by slopes and in a majority of cases these slopes were equipped with belts. Where mine cars are handled on slopes, however, 1946 witnessed a great increase in the number of hoists equipped with excitation-amplification control and dynamic braking. An article on the use and advantages of dynamic braking in hoist applications is scheduled for a future issue of *Coal Age*.

Additional belts were installed on the surface for lowering purposes, along with rope-and-button and other conveyors. The belt also was increasingly installed as a main-line haulage unit underground, although the locomotive and mine car could by no means be considered on their way out.

Greater attention to proper installation and maintenance, as well as different and better designs, were responsible for longer belts and increased speeds at some mines. One 6,000-ft. belt, for example, was being installed and will be driven by a 100-hp. motor. Some authorities and users were forecasting belt speeds in excess of 600 f.p.m. In the maintenance and repair of belts, at least one company built a special 25x275-ft. shop capable of taking two 300-ft. sections at a time. As much as 150 ft. of a belt section can be placed on top of a bench for repair while another 150 ft. is stretched beneath being heat dried.

Power Made Safer

Electrically, the trend toward rectifiers and non-inflammable transformers continued, with dry-type transformers also registering a gain. Trailing cables and grounding received increased attention. In grounding, opinion that ungrounded frames are at least as safe if not safer persisted. The year 1946, however, brought substantial progress in reducing arcs and fires in trailing cables. At least thirteen manufacturers were known to have developed neoprene-compounded outer jackets passing the overloaded-loop flame test devised by the Pennsylvania Department of Mines.

One company developed a method of shielding the live conductor in d.c. cables, connecting the shield to the shunt trip of a special breaker, as a solution to the problem of preventing arcs in trailing cables from coming

New Bituminous Preparation Facilities in 1946*

Coal Company	Plant Location	Capacity, Net Tons of Feed per Hour	Preparation Equipment
Allegheny River Mining Co.	Cadogan, Pa.	40	Roberts & Schaefer[1]
American Coal Co. of Allegany County	Deerfield, W. Va.	500	Link-Belt[2]
Amherst Coal Co.	Amherstdale, W. Va.	300	Link-Belt[3]
Berwind-White Coal Mining Co.	Wilmore, Pa.	650	Fairmont[4]
Black Diamond Coal Mining Co.	Black Diamond, Ala. (8)	80	Deister Concentrator[5]
D. L. Bradley Coal Co.	Moberly, Mo.	60	Deister Machine[6]
Caney Creek Coal Co.	Greenville, Ky.	200	McNally-Pittsburg[7]
Central Indiana Coal Co.	Odon, Ind. (2)	500	Link-Belt[8] Cent. & Mech. Ind.[8]
Chapman Coal Co.	Collinsville, Ill.	90	Deister Machine[6]
Cinderella Coal Co.	Cinderella, W. Va.	180	Jeffrey[8]
Clinchfield Coal Corp.	Fremont, Va.	400	Fairmont[4]
Consolidation Coal Co (Ky.)	Jenkins, Ky. (12)	100	Bird Machine[10] Deister Concentrator[10] Fairmont[10]
Consolidation Coal Co. (Ky.)	Van Lear, Ky.	125	Roberts & Schaefer[11]
Consolidation Coal Co. (W. Va.)	Arkwright, W. Va.	650	Fairmont[12]
Davis Coal & Coke Co.	Bayard, W. Va.	300	Fairmont[4]
Dorothy Gordon Coal Co.	Gordon, W. Va. (2)	500	McNally-Pittsburg[13]
W. G. Duncan Coal Co.	Luzerne, Ky.	250	Roberts & Schaefer[11]
Elk Creek Coal Co.	Emmett, W. Va.	225	Link-Belt
Ethel Chilton Mines, Inc.	Ethel, W. Va.	100	Roberts & Schaefer[11]
Fairview Collieries Corp.	Hillery, Ill. (6)	600	McNally-Pittsburg[14]
Franklin County Coal Corp., Inc.	Royalton, Ill.	750	Roberts & Schaefer[15]
Gulf Mining Co.	Crab Orchard, W. Va	60	Kanawha[16]
Guyan Eagle Coal Co.	Amherstdale, W. Va.	150	Link-Belt[17]
Hanna Coal Co.	Neffs, Ohio	40	Cent & Mech. Ind.[18]
	Piney Fork, Ohio (10)	100	Deister Concentrator[5]
Hickory Grove Coal Mining Corp.	Sullivan, Ind.	135	Templeton-Matthews[19] Link-Belt[19]
Homestead Coal Co.	Homestead, Ky.	900	McNally-Pittsburg[7]
Industrial Collieries Corp.	Ellsworth, Pa.	600	Fairmont[20]
Industrial Collieries Corp.	Marianna, Pa.	600	Roberts & Schaefer[21] Jeffrey[21]
Ingle Coal Co.	Elberfeld, Ind.	150	Templeton-Matthews[38] Menzies[38] Roberts & Schaefer[38]
Inland Steel Co.	Wheelwright, Ky.	150	Link-Belt
	Wheelwright, Ky.	150	Link-Belt
Island Creek Coal Co.	Holden, W. Va.	380	Link-Belt[3]
Jones & Laughlin Steel Corp.	California, Pa.	900	McNally-Pittsburg[22]
	Vestaburg, Pa.	900	McNally-Pittsburg[22]
Koppers Coal Division	Kopperston, W. Va.	100	Roberts & Schaefer[11]
Knox Consolidated Coal Corp.	Bicknell, Ind. (2)	...	Cent. & Mech. Ind.[18]
Lando Coal Corp.	Puritan, W. Va.	400	McNally-Pittsburg[13]
Leccony Smokeless Fuel Co.	Besoco, W. Va.	50	Roberts & Schaefer[1]
Little John Coal Co.	Victoria, Ill.	175	Jeffrey
Lorado Coal Mining Co.	Lorado, W. Va.	625	Jeffrey[23]
Margaret Ann Coal Co.	Conaway, Va.	40	Kanawha[16]
Mary Frances Coal Co.	Robson, W. Va.	50	Roberts & Schaefer[11]
Midvale Coal Co.	Midvale, Ohio	140	Jeffrey[22]
Moore Coal Co., Inc.	Berea, Ky.	50	Deister Concentrator[24]
Mt. Hope Coal Co.	Holcomb, W. Va.	75	Roberts & Schaefer[11]
Muskingum Coal Co.	Leesville, Ohio	400	Jeffrey[22]
		...	Cent. & Mech. Ind.[18]
New River Co.	Mt. Hope, W. Va.	60	Kanawha[16]
Ohio Power Co.	Cumberland, Ohio	600	McNally-Pittsburg[22]
Old Ben Coal Corp.	Christopher, Ill.	450	McNally-Pittsburg[25]
	Coello, Ill.	120	Kanawha[16]
	Buckner, Ill.	90	Kanawha[16]
Penn Valley Mining Co.	Hunkers, Pa.	100	Deister Machine[6]
Pond Creek Pocahontas Co.	Bartley, W. Va.	...	Kanawha[26]
Rail & River Coal Co.	Bellaire, Ohio	450	Roberts & Schaefer[27]
Raven Coals, Inc.	Raven, W. Va.	40	Kanawha[16]
Red Parrot Coal Co.	Prenter, W. Va.	80	Roberts & Schaefer[1]
Republic Steel Corp.	Indianola, Pa.	450	Fairmont[28]
Rochester & Pittsburgh Coal Co.	Homer City, Pa.	600	Heyl & Patterson[29] Deister Concentrator[29] Cent. & Mech. Ind.[29]
Rochester & Pittsburgh Coal Co.	Lucerne, Pa.	450	Fairmont[4]
Scotia Coal & Coke Co.	Brooklyn, W. Va.	60	Kanawha[16]
Seneca Coal Co.	Morris, Okla. (2)	300	McNally-Pittsburg[30]
Snow Hill Coal Corp.	Terre Haute, Ind.	600	McNally-Pittsburg[7]
Templeton Coal Co.	Sullivan, Ind.	400	Templeton-Matthews[31]
Truax-Traer Coal Co.	Liverpool, Ill.	500	Link-Belt[32]
	Ceredo, W. Va.	900	McNally-Pittsburg[33]
	Kayford, W. Va.	200	McNally-Pittsburg[34]
	Elkville, Ill.	85	McNally-Pittsburg[34]
	Colcord, W. Va.	600	Kanawha
Union Colliery Co.	Dowell, Ill.	500	McNally-Pittsburg[7]
Utah Fuel Co.	Castlegate, Utah	25	Link-Belt[35]
Valley Camp Coal Co.	Elm Grove, W. Va.	205	McNally-Pittsburg[13]
Williams Coal Co.	Mannington, Ky. (2)	30	Deister Machine[36]
Winifrede Collieries	Winifrede, W. Va.	200	Kanawha
Woodward Iron Co.	Woodward, Ala	250	Jeffrey[21]
		...	Cent. & Mech. Ind.[18]
Youghiogheny & Ohio Coal Co.	Rayland, Ohio	300	Roberts & Schaefer[37]

through to the outside (October, 1946, *Coal Age*). When the breaker trips, it cannot be reset and the cable must be taken off and replaced by another.

Carrier-current "radio" communication between stationary points and/or moving equipment, via the trolley wire, appeared to be solved by post-war frequency-modulation equipment (November, 1946, *Coal Age*). Following the initial installation, similar equipment has been installed at a number of properties, both large and small.

New shops, especially underground, and new tools and testing equipment, were evidence of advances in maintenance in 1946, in which year a study placed average cost of maintaining 590 loaders over the country at 7½c. per ton (labor, 45 percent; materials, 55). Costs ranged from 3.9 to 8.9c. in the

*Includes additions and installations of new preparation equipment in existing structures. When more than one unit was installed in a plant, the number, when available, appears in parentheses following the plant address.

[1]Stump Air-Flow cleaning equipment. [2]Including washing equipment. [3]Link-Belt air-pulsated wash-box equipment. [4]Including Chance-cone cleaning equipment. [5]SuperDuty Diagonal-Deck No. 7 tables with Concenco revolving feed distributor.

[6]PLAT-O screen installation. [7]Including McNally-Norton automatic washers in compound circuit with McNally-Carpenter centrifugal dryers. [8]Including Link-Belt air-pulsated wash boxes, Bradford breaker, heat-drying equipment and C-M-I continuous centrifugal dryer. [9]Diaphragm-jig equipment. [10]Fine-coal plant by Fairmont, including ten SuperDuty Diagonal-Deck tables and two Bird filters.

[11]Hydroseparator coal-washing equipment. [12]Including Chance-cone washing equipment and river-loading facilities. [13]McNally-Norton automatic washing equipment. [14]Including McNally-Norton automatic washers, McNally-Rheo fine-coal cleaning equipment, McNally-Carpenter centrifugal dryers and McNally-Vissac thermal dryers. [15]Combination wet-and-dry plant with tandem hydroseparators and Stump Air-Flow cleaners.

[16]Kanawha-Belknap chloride washer or washers. [17]Stoker plant. [18]C-M-I continuous centrifugal dryer or dryers. [19]Including Link-Belt trough washer, increased stoker facilities, etc. [20]Including Chance-cone equipment, Deister Concentrator tables, plus Link-Belt mine-car dumping and feeding equipment.

[21]Including Jeffrey Baum-jig equipment. [22]Including McNally-Rheo launder equipment. [23]Washing plant. [24]Including Leahy NO-Blind screen installation. [25]Stoker plant, including crushers, American "Twin-Dex" pneumatic separators and dust-collecting equipment.

[26]Kanawha-Belknap chloride washer, 50 t.p.h., 160-ton rescreening plant. [27]Tandem hydroseparators in complete plant. [28]Complete plant, Chance cones, Deister Concentrator tables. [29]Complete plant, including Chance cones, 14 SuperDuty No. 7 Diagonal-Deck tables with two Concenco revolving feed distributors and two C-M-I continuous centrifugal dryers. [30]Including McNally-Norton automatic washers and McNally-Carpenter centrifugal dryers.

[31]New washing plant including used Link-Belt box and centrifugal drying of carbon, plus crushing facilities. [32]Rail-river transfer plant. [33]Central cleaning and river-loading plant, including McNally-Pittsburg rotary breaker, McNally-Norton automatic washers, McNally-Rheo fine-coal launders and McNally-Carpenter centrifugal dryers. [34]McNally-Rheo fine-coal plant with hydraulic refuse disposal and water-handling facilities. [35]Fine-coal dewatering equipment.

[36]No. 16 PLAT-O coal-washing tables. [37]Complete plant with tandem hydroseparators, 200 t.p.h. [38]Including Menzies cone separator.

Stripping, active in 1946 in the East and South, as well as in the older regions, included wider use of equipment other than shovels for removing overburden.

various districts. Average time between major overhauls was 19 months, the maximum 36 and the minimum four. Aside from this study, general opinion was that losses from mechanical and electrical delays and also maintenance cost were coming down as a result of better methods, better materials and better equipment for handling maintenance work, plus improved lubricants and lubricating equipment. Greasing trucks for underground use increased substantially, while several operators installed centralized lubricating systems on loading machines and in preparation plants (January, 1947, *Coal Age*). Results included fewer machine breakdowns and substantial labor savings.

Stripping

Continuance and expansion of activity in the East and South were a major factor in the increase in strip percentage in 1946, along with increases in such other areas as west Kentucky and the Far West. One of the industry's problems was not overburden and the like but legislative threats. These continued in spite of increasing evidence that strip spoils are profitable and that they probably yield the highest return when left undisturbed. One old spoil area, however, was levelled and was growing corn with a profit. However, cattle raising (p. 92 of this issue), plus the growing of fruit and other trees, as well as other activities more suitable to undisturbed spoil, were increasingly demonstrating their advantages.

Top capacity of strip shovels definitely went up to 40 cu.yd. in 1946. Equipment in outcrop strippings also showed the trend to larger units. Likewise, overburden removal with bulldozers and scrapers attracted a growing number of adherents. Problems of thicker overburden were met by more draglines, by tandem operation, by ramping across the pit where a dragline is employed, with some spoil rehandling (December, 1946, *Coal Age*), and by the rather unusual practice, so far, of working two shovels together. At at least one operation, two shovels with equal capacity and reach work together, one following the other. The result is increased stripping width without rehandling spoil. An article on this operation is scheduled for a future issue of *Coal Age*.

Drilling was the subject of equally if not more intensive work in 1946, which was marked by continuance and expansion of the use of high-level drills in breaking hard layers high up in the bank. New models of horizontal drills increasingly featured hydraulic drives and greater flexibility in hole height and direction, while the trend was toward higher capacity and larger holes with vertical units, along with dividing, or "decking," charges to break layers at different levels in the higher banks. Alloy-insert bits were increasingly used and proved their ability to increase footage substantially.

More dumps were installed to accommodate the cheaper flat-bed trucks and in one case (December, 1946, *Coal Age*), the bin was arranged with sides that slide up and down, thus permitting end-dump trucks to drive through and discharge without backing. Tandem drives were increasingly applied to trucks and a number were equipped with hydraulic retarders to reduce braking on heavy grades.

Preparation

The year 1946 was an active one in the installation of preparation facilities in the bituminous industry. Emphasis was more than ever on mechanical cleaning. There were fewer contracts than perhaps ever before for straight screening and picking plants or installations. In the line of auxiliary facilities, special storage and blending equipment, as well as special surge equipment, ahead of preparation plants or preparation facilities, including bins underground, showed a substantial increase in 1946.

As in past years, many mechanical units went into existing plants to handle specific sizes. Some companies adopted combination wet-and-dry equipment. Primarily, however, dry equipment was installed for screenings or other fines sizes. Top sizes in mechanical cleaning again reached 8 in. or better, although 3 to 6 in. was more common.

The practice of washing coarse coal and loading the fines raw also was again evident in several installations in 1946. The year, however, witnessed a definite trend toward mechanically cleaning the fines (down to ⅛ in. or less) and toward doing it more efficiently. Work in this direction included investigation and testing of foreign fine-coal units, with installation a possibility in the near future. To handle the fine-coal cleaning job, operators called increasingly on tables in 1946, along with launders and other units especially adapted to handling fines efficiently.

With wet washing increasing, operators turned increasingly toward drying. Centrifugal dryers were fairly numerous, although thermal units were popular. A few operators adopted hydraulic desliming prior to centrifuging, and new centrifugal filter equipment went into several plants.

Rescreening and special stoker-coal plants, with crushing, screening, storage and blending facilities, remained popular in 1946. Rotary breakers for coarse-coal preparation went into several additional plants. Vibrating screens again increased their sway not only for fines and dewatering but for coarse-coal sizing. Hydraulic disposal of both fines and coarse material increased in 1946. Reduction in manpower was a factor in the increasing adoption of mechanical-cleaning equipment but work in this direction took in other operations as well, such as handling cars in the yard. Indications were that expenditures of quite a few thousand dollars would be warranted to save a man.

ANTHRACITE INDUSTRY
Stresses Efficiency and Research

Additional laboratory facilities lay foundation for intensified utilization drive. Stripping plays larger production role. Problem of raising deep-mine efficiency attacked by new equipment and education of miners. Beneficiation of fines the major goal in preparation.

ANTHRACITE, by accepting the provisions of the government-imposed settlement in the bituminous industry, was able to stay out of the hands of the government in 1946 and, except for a short stoppage, to produce regularly throughout the year. Demand ran ahead of output and still was fairly strong going into 1947. The limitations were largely manpower and continued low production per man in deep mines, although competition was no less tough.

To meet competition, anthracite intensified its research and merchandising efforts in 1946 and worked with union representatives, as well as on its own account, to stimulate a desire to raise productivity on the part of miners. In addition, it placed increasing emphasis on stripping and devoted greater attention to equipment and methods for raising output per man in deep mines. Preparation improvements, as in other late years, were mainly concentrated on reclamation and beneficiation of sizes from No. 1 buckwheat down.

Demand, competition and ability to produce finally worked out to a total output (preliminary figures) of 60,685,000 tons in 1946, an increase of 10.3 percent over the 1945 total of 54,934,000 tons. Making the usual assumptions of no work stoppages and good business activity in 1947, the prospects are bright for continuance of demand for anthracite at recent levels or higher. Consequently, there are sound reasons for forecasting that production this year will exceed that of 1946 if the industry is able to operate continuously, and that that rate of production should extend at least into 1948.

In the search for methods of raising underground productivity, anthracite operators turned more to mechanical methods, including use of machines such as this in rock tunneling, gangway and counter work.

Cost Still Problem

This relatively optimistic view of the future from the production standpoint does not alter the fact that anthracite still has a number of problems to cope with in meeting competition and building a better foundation for future progress. These problems include cost of product, involving also productive efficiency, quality, manpower and an upsurge in public discontent with coal growing out of the troubles in both the bituminous and anthracite branches of the industry, especially the former, in recent years.

Along with that of bituminous coal and oil, anthracite also met increased competition from manufactured gas, evidenced by such developments as a rush of orders in New York City and State that led gas companies to ration or refuse installations. When, as now seems inevitable, Big and Little Inch are confirmed as natural-gas carriers, anthracite faces the probability of additional competition from that direction as well.

Anthracite, however, has not been idle. In fact, there is justification for

Stripping continued to grow in the anthracite region in 1946 as a means of sweetening cost, increasing coal recovery and offsetting a tight manpower situation.

contending that 1946 marked a new high in effort on the research, sales and production fronts. One of the outstanding products of research—the "Anthratube"—went to work in earnest in 1946 in "Simpli-Fire" homes, designed and developed by the industry and widely publicized in the year just past. In addition to intensification of its own efforts, anthracite received potent help from a number of outside sources, including a study of the screening of fine coal. An outstanding development was the announcement early in 1947 that the federal government was ready to start construction of a $450,000 laboratory at Hazleton, Pa., to investigate anthracite problems and aid the industry.

Work to extend anthracite's field of application included successful tests of anthracite for gas in Wellman-Galusha producer equipment at Trail, B. C., presaging increased adoption and use. The year also marked further progress in other home-heating and industrial projects.

To obtain the full benefits of research and merchandising efforts, anthracite also took steps to assure adequate production at lower cost, involving both number of men and steps to increase their productivity. The necessity for recruiting and training men was recognized both informally and, in at least one case, formally. One company was reporting good initial response to a plan for hiring new men and giving them special training to start them right, thereby making them more likely to stay in the industry while at the same time doing a better job.

Output per man remained a serious factor in industry affairs in 1946, as it still does in 1947. Stripping apparently increased again in 1946, with more promised for 1947. The rising trend in strip percentage, plus bank reclamation and dredging, will be the major factors, all the evidence indicates, in any increase in output per man when the 1946 figures are compiled. How much the 2.79 tons per man-shift in 1944 and 1945 will be exceeded in the future is speculative but until plans now under way get farther along stripping will exert the major influence. Available figures seldom show more than 2 tons per man at underground operations, including the necessary surface personnel, with many less than 1½ or 1 tons.

In 1945, production by various types of recovery was: deep mines, mechanically loaded, 25.4 percent; hand loaded, 38.2; stripping, 18.2; bank reclamation, 16.0; and dredging, 2.2 percent. The stripping percentage, as noted, is expected to increase in 1946. The southern and middle fields, in particular, are pushing stripping to sweeten the cost of deep-mined tonnage and also raise output in the face of a tight manpower situation. Size of equipment is rapidly rising. Two additional 25-cu.yd. walking draglines went into service in 1946, bringing the total to four. Four more were scheduled for future delivery to the western and eastern middle fields. Meantime, stripping and loading with smaller equipment was active, with the trend toward increasing depths and yardages—also responsible, in part at least, for the trend toward larger equipment.

Anthracite operators bought freely of underground mechanical-mining equipment, particularly conveyors, as shown in the summary beginning on p. 89 of this issue. Additional duckbills were installed, along with new and replacement scrappers. Several chain-conveyor installations proved beneficial in slope sinking and mother-belt set-ups increased. One belt ap-

New Anthracite Preparation Facilities in 1946*

Coal Company	Plant Location	Capacity, Net Tons of Feed per Hour	Preparation Equipment
Adelphia Coal Co.	Lytle, Pa. (12)	80	Deister Concentrator[1]
Bellevue Coal Co.	Scranton, Pa. (9)	48	Deister Concentrator[1]
	Janesville, Pa. (10)	70	Deister Concentrator[1] [2]
Blue Diamond Coal Co.	Bernice, Pa.	40	Menzies Separator Co.
Buck Run Coal Co.	Buck Run, Pa.	50	Wilmot[3]
Centralia Mining Co.	Centralia, Pa.	190	Wilmot[4] Chance[4]
Dark Water Coal Co.	Darkwater, Pa.	15	Wilmot[3]
DeAngelis Coal Co.	Carbondale, Pa. (4)	40	Deister Concentrator[5]
Diminick & Zupicich Coal Co.	Shamokin, Pa.	20	Wilmot[6]
Diamond Washeries	Tamaqua, Pa. (2)	16	Deister Concentrator[5]
Donaldson Coal Co.	Tremont, Pa	15	Deister Concentrator[5]
Eagle Hill Coal Co.	St. Clair, Pa. (3)	16	Deister Concentrator[1]
Glen Alden Coal Co.	Edwardsville, Pa. (3)	210	Menzies Separator Co.[7]
	Wanamie, Pa.	100	Menzies Separator Co.[7]
	Kingston, Pa. (3)	120	Wilmot[8]
Haddock Mining Co.	Beaver Meadows, Pa. (2)	20	Deister Concentrator[5]
Heidelberg Coal Co.	Avoca, Pa. (5)	32	Deister Concentrator[1]
Hoover Coal Co.	Cressona, Pa.	8	Deister Concentrator[5]
Hudson Coal Co.	Scranton, Pa. (48)	...	Humphreys[10]
Oscar Hummel	Selingrove Pa. (2)	12	Deister Concentrator[5]
Indian Run Coal Co.	Indian Run, Pa. (2)	40	Wilmot[6]
Jaycox & Forman	Cold Springs, N.Y.	15	Deister Concentrator[5]
Jeddo-Highland Coal Co.	Harleigh, Pa.	105	Wilmot[3]
Joliett Coal Co.	Tremont, Pa.	20	Wilmot[6]
Jonathan Coal Mining Co.	Dornsife Pa.	8	Deister Concentrator[5]
Live Oak Coal Co.	Minersville, Pa. (2)	40	Wilmot[6]
	Minersville Pa. (2)	40	Wilmot[3]
Locust Coal Co.	Shenandoah, Pa.	200	Chance[9]
	Shenandoah Pa.	15	Deister Concentrator[5]
Locust Valley Coal Co.	Morea, Pa. (6)	54	Deister Concentrator[5]
Markson Coal Co.	Goodspring, Pa. (2)	110	Menzies Separator Co.[2]
Morgan Coal Co.	Old Forge, Pa.	12	Menzies Separator Co.[2]
Oak Ridge Coal Corp.	Raven Run Pa. (2)	140	Menzies Separator Co.[2]
Phoenix Coal Co.	Phoenix Park, Pa. (2)	55	Wilmot[6]
	Phoenix Park, Pa (2)	44	Menzies Separator Co.[2]
Rhonda Coal Co.	Dunmore, Pa (2)	16	Deister Concentrator[5]
Russell Mining Co.	Moosic, Pa.	12	Menzies Separator Co.[2]
Tuscarora Stripping & Mining Co.	Tuscarora, Pa.	60	Wilmot[3]
Waddell Coal Mining Co.	Archbald, Pa.	100	Chance[9]
	Winton, Pa.	12	Menzies Separator Co.[2]
William Penn Anthracite Coal Co.	Shaft, Pa.	8	Deister Concentrator[5]
Winton Coal Mining Co.	Tamaqua, Pa.	20	Wilmot[6]
	Tamaqua, Pa.	60	Wilmot[3]
Raymond Wren	Williamstown, Pa. (2)	16	Deister Concentrator[5]

*Includes contracts for installation of preparation equipment in existing structures. Where more than one unit of preparation equipment was installed, the number, when available, is included in parentheses after the plant address.

[1]SuperDuty No. 7 Diagonal-Deck tables with Concenco revolving feed distributors. [2]Menzies cone-separator cleaning unit or units. [3]Wilmot Hydrotator equipment. [4]Complete plant, including Chance cone.

[5]SuperDuty No. 7 Diagonal-Deck table or tables. [6]Wilmot Simplex jig or jigs. [7]Menzies cone-separator units built by Glen Alden. [8]Wilmot hydroseparators. [9]Chance cone. [10]Humphreys spiral concentrator installation for silt reclamation.

plication was mining upper seams through rock holes, making it unnecessary to drive car-height slopes and gangways. Another belt application was reported to be gathering on gangways in pitching work.

Operators and the U. S. Bureau of Mines participated in the study, development and application of new mining and loading equipment, as well as new mining methods. Metal-mine and rock-type loaders apparently solidified their place in the anthracite industry as a means of speeding development and cutting the cost of the rock work necessary in opening and working new sections and new mines.

Increased use of machines in heavily pitching veins was a major objective in research in 1946, along with special equipment of the mining and loading type. Results were reflected in development of new equipment for driving coal gangways and chamber and pillar mining in pitch areas, now undergoing preliminary trials. Scheduled also was the construction and testing of a unit modelled on the German "coal planer," a mining and loading unit looked upon as a likely means of increasing output per man in the thinner veins.

Advances in auxiliary equipment and methods included additional installations of newer and larger cars, including the second group of steel cars with anti-friction bearings and automatic couplers. In the compressed-air field, 1946 marked the first use of after-coolers as well as a synchronous-motor drive with an extra-heavy rotor to provide a flywheel effect without a separate flywheel. In one case, the main compressor station on the surface was augmented by portable compressors underground to keep the pressure up to 90 lb. or higher. Testing with a gage with a hypodermic needle to insert into the hose line also came into practice.

The anthracite region now boasts more than 30 deepwell pumps, 21 oil-lubricated and nine water. Individual capacities range from 600 to 5,600 g.p.m.; heads from 100 to 500 ft. The increase reflects the advantages of the equipment for many dewatering applications. In one instance, because delivery of a standard vertical motor was delayed, a 200-hp. 1,800-r.p.m. 2,200-volt totally inclosed fan-cooled ball-bearing unit of the horizontal type was turned up vertically and operated successfully.

More electrical substations were being modernized. Installation of metal-clad switchgear with adequate interrupting ratings enabled substations to carry and give protection to the increasing loads carried at collieries. Most of the circuit-breaker installations provide for electrical closing and tripping of the individual units. Many of the breakers installed on 2,300- and 4,000-volt circuits were of the air type.

More ground detectors were installed on the bus structures of delta-connected distribution systems. In new stripping substations, unit outfits with three-phase transformers instead of three single-phase units seemed to be preferred. Modern stripping substations include a special grounding resistor, mounted in the ground wire between the neutral of the transformer's secondary winding and the nearest station ground on the four-wire 4,000-volt system, to afford workmen greater protection against faults in equipment.

In the field of preparation and related activities, attention was concentrated on the beneficiation of the finer sizes. Two additional 1,000-ton briquetting plants went into production in 1946 and one organization expanded its facilities for the production of a light aggregate from refuse. Refuse disposal was marked by the installation of a larry train operating on a 10-percent grade.

Flotation as a means of recovering and preparing very fine anthracite was improved in 1946 and progress was made in the direction of more efficient and lower-cost dewatering and drying. Tables, fine-coal washers and classifiers, largely for No. 1 buck and smaller (particularly No. 4 and No. 5) led the list of equipment installations. Cone units led installations for the larger sizes. One company put in a spiral-concentrator plant (36 first-stage and 12 second-stage six-turn units) for reclaiming boiler fuel from silt from one of its operations.

MINE SAFETY
Sets New Record in 1946

Combined anthracite and bituminous fatality rate best in recorded history. Bituminous coal sets a new record. Anthracite third lowest. Falls still the major problem.

By FORREST T. MOYER
Chief, Accident Analysis Division,
U. S. Bureau of Mines

A MARKED IMPROVEMENT in coal-mine safety during 1946 is indicated by the fatality record for the year. Appreciably better than in 1945, it was again the best in the history of the industry. The improvement may be attributed to intensified safety work, to which workers, industry officials and State and Federal safety-inspection services each made vital contributions.

Based upon nearly complete reports, an estimated total of 974 men lost their lives at work in bituminous-coal, anthracite and lignite mines during 1946. This was the fourth successive year in which the number of fatal injuries had been reduced, and fewer men were killed in 1946 than in any other year since complete accident statistics first were compiled in 1910. The 1946 total represented 105 fewer fatalities than the 1,079 recorded for 1945. It also was 90 fewer than the 1,064 fatal injuries in the depression year of 1933, which had the next lowest annual total since complete statistics became available in 1910.

The tentative total of 974 fatalities in 1946 occurred at a rate of 1.64 per million tons of coal, the lowest of any year in a statistical series extending back to the early 1870's. This frequency of occurrence was 4 percent below the fatality rate of 1.71 per million tons in 1945 and far under the corresponding rate of 2.78 in 1933.

The number of fatal injuries in all coal mines has been lowered each year since 1942, when 1,471 men lost their lives.

At bituminous and lignite mines, an estimated total of 800 men were killed at work in 1946, the lowest number in any year since the beginning of complete fatality statistics in 1910. This was 136 fewer fatal injuries than in 1945 and 33 less than in 1933, when the next lowest number of men lost their lives. The 1946 fatalities occurred at a rate of 1.50 per million tons during the mining of 532,000,000 tons of bituminous coal, a frequency rate appreciably below that of 1.62 in 1945 and also the lowest of any year in a statistical history extending back to 1874. Since 1942, when 1,245 men were killed in bituminous mines, the number of fatal injuries has been reduced each year through 1946. If the rate of 2.14 fatal injuries per million tons in 1942 had prevailed through 1946 there would have been 889 more fatalities than actually occurred—45 in 1943, 206 in 1944, 300 in 1945 and 338 in 1946.

Of the total fatalities in 1946 at bituminous operations, 734 occurred in underground workings, 22 in strippings and 44 at surface works associated with deep mines.

At Pennsylvania anthracite mines, it is estimated that 174 workers lost their lives in accidents during 1946, an increase of 31 fatalities over the total of 143 in 1945. Based upon a production (preliminary figure) of 60,685,000 net tons, these fatalities occurred during 1946 at a rate of 2.87 per million tons of clean coal produced. Although higher than the frequency of 2.62 fatal injuries per million tons in 1945, which was the best in the history of the anthracite industry and also higher than that of 2.75 in 1944, the 1946 rate was the third lowest in a statistical series extending back to 1870. At anthracite operations, 153 of the fatalities took place in underground workings, nine in strippings and 12 in surface operations in connection with production.

Major Disasters

The record of two major disasters—those in which five or more men were killed in a single accident or explosion—causing a loss of 27 lives in 1946, was better than in 1945, when five disasters caused 68 fatalities. The loss of life in major disasters in 1946 was the third lowest in coal history, only 1933 and 1934 having lower totals—seven and 22, respectively.

Both major disasters in 1946 were mine explosions. The first occurred Jan. 15 in a bituminous mine in West Virginia and killed 15 men. The second was on April 18 in a semi-anthracite mine in Virginia and caused 12 men to lose their lives. It is notable that, up to the close of 1946, only one major disaster had occurred in Pennsylvania anthracite mines in 8½ years.

Falls of Roof and Face

More than half the total number of fatalities at all coal mines in 1946 were caused by falls of roof and face. This hazard killed 549 men during the year at a rate of 0.93 per million tons compared to a corresponding frequency of 0.85 in 1945. The less favorable statistics on falls in 1946 indicate the need for more intensive safety work on this cause.

Although the number of fatal injuries in bituminous mines from roof and face falls was reduced from 462 in 1945 to 445 in 1946, the rate of occurrence per million tons advanced from 0.80 in 1945 to 0.84 in 1946. In Pennsylvania anthracite mines the estimated total of 104 fatalities caused by falls of roof was 31 above the 1945 total of 73. In these operations, the

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Coal-Mine Fatalities in the United States During 1946*

Cause and Location	Bituminous — Number of fatalities	Bituminous — Rate per million tons mined	Pa. anthracite — Number of fatalities	Pa. anthracite — Rate per million tons mined	Total — Number of fatalities	Total — Rate per million tons mined
Underground:						
Falls of roof and face..	445	0.836	104	1.714	549	0.926
Haulage.....	164	0.308	21	0.346	185	0.312
Explosions: Local....	3	0.006	2	0.033	5	0.008
Major...	27	0.051	...	.....	27	0.046
Explosives.....	12	0.023	8	0.132	20	0.034
Electricity.....	24	0.045	3	0.049	27	0.046
Machinery.....	27	0.051	1	0 016	28	0.047
Shaft.....	8	0.015	1	0.016	9	0.015
Miscellaneous.....	24	0.045	13	0.214	37	0.062
Total underground..	734	1.380	153	2.521	887	1.497
Stripping.....	22	0.041	9	0.148	31	0.052
Surface.....	44	0.083	12	0.198	56	0.094
Total, 1946.....	800	1.504	174	2.867	974	1.643
Total, 1945.....	936	1.620	143	2.616	1,079	1.706
Production, 1946, tons (est.).....	532,000,000		60,685,000		592,685,000	
Production, 1945, tons...	577,617,327		54,673,567		632,290,894	

* Estimated from nearly complete returns.

frequency rate of fatal injuries from this hazard likewise increased appreciably from 1.34 per million tons in 1945 to 1.71 in 1946.

Haulage

Haulage commonly ranks second among the principal causes of fatal injuries in underground workings. Only in years when heavy loss of lives results from mine explosions or fires is the haulage hazard displaced to third position. Haulage accidents in 1946 resulted in 185 fatalities, a reduction of 46 from the 1945 total of 231. The death rate also underwent a gratifying reduction from 0.37 in 1945 to 0.31 in 1946.

In bituminous mines it is estimated that 164 men lost their lives in haulage operations during 1946, compared to 208 in 1945. A similar improvement is noted in the rate of occurrence of these haulage fatalities, which dropped from 0.36 per million tons in 1945 to 0.31 in 1946. At anthracite operations, haulage was safer in 1946 and the number of fatal injuries was reduced to 21 from 23 in 1945. There was an appreciable reduction in the frequency from 0.42 in 1945 to 0.35 per million tons in 1946.

Gas and Dust Explosions

A total of 32 workers were injured fatally by gas and dust explosions in all coal mines during 1946, whereas 78 were killed in 1945. Of the 1946 total, 27 lives were lost in major explosions (five or more fatalities per explosion) compared to the corresponding loss of 63 lives in 1945. The fatality rate of 0.05 for major explosions in bituminous-coal mines in 1946 was well below the frequency of 0.11 per million tons in 1945. None of the explosions in anthracite mines fell into the major class. Local explosions of gas and dust killed five men, three in bituminous and two in anthracite mines. In 1945, local explosions caused losses of 10 lives in bituminous-coal mines and five in anthracite operations. Fatal injuries from local explosions in all coal mines occurred at a rate of 0.01 in 1946.

Explosives

The 20 explosives fatalities in 1946 occurred at a rate of 0.03 per million tons mined, which was lower than the comparable frequency of 0.05 in 1945. In bituminous mines the handling and use of explosives caused 12 deaths at a rate of 0.02, which was more favorable than the 1945 rate of 0.04 per million tons. In anthracite operations, explosives caused eight fatalities at a frequency of 0.13 per million tons, which was slightly lower than in 1945.

Electricity

Fatality experience with electricity was not as favorable in 1946 as in 1945. This hazard caused 27 deaths in all coal mines, or at a rate of 0.05 per million tons, compared to 23 fatalities and a rate of 0.04 in 1943.

Experience with electricity was less favorable in both bituminous and anthracite mines. In bituminous operations, this hazard caused 24 fatal injuries at a rate of 0.05 per million tons, whereas in 1945 the 21 fatalities occurred at a frequency of 0.04. In anthracite mines, the three fatalities from electricity and the rate of 0.05 per million tons in 1946 both were above the two fatalities and the frequency of 0.04 in 1945.

Machinery

Notable progress was made in 1946 in the safe operation of mining machinery. The machinery hazard in 1946 caused the deaths of 28 men in the underground operation of all coal mines at a frequency of 0.05 per million tons. In 1945, 40 fatalities at a rate of 0.06 were chargeable to machinery. Twenty-seven of the 1946 fatal injuries from machinery occurred in bituminous mines and one in an anthracite mine or respective reductions of 11 and 1 from 1945

Other Causes

Nearly 90 percent of the fatal injuries in coal mines resulted from the foregoing principal causes of accidents. The remainder were caused by a variety of relatively minor causes in underground work, in stripping operations and in surface works associated with deep mines. In surface works, 56 men were killed, this total representing 6 percent of all fatalities at coal mines in 1946. Hazards in coal strippings cost 31 lives or five more than in 1945. Safety was improved at bituminous strippings, and the 1946 total of 22 fatalities was two less than in 1945. However, at anthracite strippits the nine fatal injuries were seven more than in 1945.

Non-Fatal Injuries

It is estimated that approximately 57,000 non-fatal lost-time injuries occurred at all coal mines in 1946, at a rate of 96.2 per million tons of production. In bituminous mines, an estimated total of 44,000 lost-time injuries resulted in a frequency of 82.7 per million tons. The tentative total of 13,000 non-fatal injuries at anthracite operations is estimated to have occurred at a rate of 214.2 per million ton of output in 1946. Estimates of non-fatal lost-time injuries may be subject to wide revisions upon receipt of detailed data from the producing companies as a result of the regular canvass of production and other data.

LOADING AND CLEANING

Featured by Heavy Equipment Purchases

Loader sales reach new high. Conveyor sales highest since 1942. Capacity of new preparation equipment runs well ahead of 1945.

By W. H. YOUNG
Chief, Bituminous Coal Section
And R. L. ANDERSON
Assistant Chief, Bituminous Coal Section
U. S. Bureau of Mines

SHIPMENTS of mechanical loading equipment to United States coal mines, in terms of capacity, were 20 percent greater in 1946 than in 1945 and were almost as large as in the record year 1941. The capacity of mechanical cleaning equipment sold for use at bituminous coal mines in 1946 was 78 percent greater than in 1945. Shipments of "mother" conveyors increased 32 percent in 1946, and shuttle car sales in 1946 more than doubled the number sold in 1945.

This survey was made possible by the courteous cooperation of all known manufacturers of mechanical cleaning equipment for bituminous coal and of mechanical loading and supplementary haulage equipment for use in all coal mines, plus data from various trade journals.

Mechanical loading units "sold in 1946" represent shipments made during 1946. Only a small percentage of the mechanical-cleaning equipment sold in 1946 was placed in operation during the year. The balance will be installed during 1947 and 1948.

Mechanical Loading

Although the tonnage of coal mechanically loaded at underground bituminous and lignite mines decreased from 274,189,132 tons in 1944 to 262,512,729 in 1945, the percentage of the total underground output so loaded increased from 52.9 in 1944 to 56.1 in 1945. Mechanical loading in Pennsylvania anthracite mines showed similar trends. Tonnage decreased from 14,975,146 in 1944 to 13,927,955 in 1945, while the percentage of the total underground output mechanically loaded increased from 35.8 to 39.9 during the same period.

Table I gives data on bituminous coal and lignite by methods of mining and mechanical cleaning for 1944-46 inclusive. Preliminary 1946 estimates indicate that for every ton loaded by hand 2 tons were loaded mechanically by power shovels at strip mines or by loading devices in deep mines.

Types of units sold—Table II gives the number of units of mechanical-loading equipment sold to bituminous, anthracite and lignite mines for under-

Table I—Bituminous Coal and Lignite Production by Methods of Mining and Mechanical Cleaning, in the United States, 1944-46, Inclusive

	1944		1945		1946 [1]	
	Thousands of net tons	Percent of total	Thousands of net tons	Percent of total	Thousands of net tons	Percent of total
Surface stripping	100,898	16.3	109,987	19.0	109,000	20.5
Hand loaded underground	244,489	39.5	205,118	35.5	177,000	33.3
Mechanically loaded underground	274,189	44.2	262,512	45.5	246,000	46.2
Total production	619,576	100.0	577,617	100.0	532,000	100.00
Mechanically cleaned	158,727	25.6	147,886	25.6	140,000	26.3

Preliminary.

Table II—Units of Mechanical Loading Equipment Sold to Bituminous Coal, Anthracite, and Lignite Mines for Underground use in the United States, as Reported by Manufacturers, 1938-46, Inclusive

	1939	1940	1941	1942	1943	1944	1945	1946	Percent change, 1946 from 1945
Type of equipment:									
Mobile loaders	292	233	368	352	234	286	359	495	+37.9
Scrapers [1]	26	39	11	29	15	39	26	35	+34.6
Conveyors [2]	1,311	1,762	2,130	1,491	1,100	708	861	1,157	+34.4
Pit-car loaders	2	3	10	2	1	.....	[3]	[3]	....
Total, all types	1,631	2,037	2,519	1,874	1,350	1,033	1,246	1,687	+35.4
Number of manufacturers reporting	31	32	32	28	24	22	25	23	....

[1] Reported as scrapers or scraper haulers and hoists.
[2] Includes hand-loaded conveyors and those equipped with duckbills or other self-loading heads. Sales of both loading heads and shaker conveyors were counted for the years 1939-41, inclusive, but the figures for 1942-46, inclusive, do not include loading heads separately.
[3] Canvass of sales of pit-car loaders discontinued in 1945.

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ground operation for 1939-46 inclusive.

Mobile-loader sales in 1946 totaled 495, exceeding the previous high of 368 in 1941. Sales of scrapers increased from 26 in 1945 to 35 in 1946, or 34.6 percent. Conveyor sales were 1,157 in 1946 compared to 861 in 1945, an increase of 34.4 percent.

Regional distribution of sales—Table III gives the number of mechanical loading units shipped during 1946 to the various States and regions. Types of equipment shipped are indicated by letter symbol in approximate order of capacity. For example, 70 mechanical loading units were shipped to Alabama. Of this total, mobile loading machines (indicated by "L") furnished the largest addition to capacity, followed by conveyors ("C") and scrapers ("S"). Capacities are based on 1945 records of actual performance reported by mine operators. In 1946, 1,331 mechanical loading units of all types were shipped to bituminous coal and lignite mines, compared with 1,093 in 1945, an increase of 238 units or 22 percent. The total number of units shipped to Pennsylvania anthracite mines increased from 153 in 1945 to 356 in 1946, or 133 percent.

Mechanical-loading equipment exported in 1946, in terms of capacity, amounted to approximately 11 percent of the shipments made to mines in the United States.

Table III—Total Number of Units of Mechanized Loading Equipment Shipped for Use in Each State or Region in 1946

(L—Mobile loading machines; S—Scrapers; C—Conveyors)

State and region	Number of units of all types shipped in 1946	Types of equipment in approximate order of capacity
Northern Appalachian States:		
Maryland	5	C.
Michigan	3	C.
Ohio	57	L.C.
Pennsylvania	213	L.C.
Southern Appalachian States:		
Alabama	70	L.C.S.
Kentucky	156	L.C.
Tennessee	25	L.C.
Virginia	35	L.C.
West Virginia	594	L.C.S.
Middle Western States:		
Illinois	32	L.C.
Indiana	19	L.C.
Trans-Mississippi States:		
Arkansas	12	C.
Colorado	32	C.L.
Iowa and Kansas	8	L.C.
New Mexico and North Dakota	11	L.
Oklahoma	13	C.
Utah	17	L.C.S.
Wyoming	29	C.L.
Total bituminous and lignite	1,331	L.C.S.
Pennsylvania anthracite	356	C.S.L.
Grand total	1,687	L.C.S.

Types of machines sold compared with units in use—The trend in demand for various types of mechanical-loading equipment is shown in Table IV. The number of mobile loaders and hand-loaded conveyors in use at bituminous and lignite mines more than doubled in the seven-year period 1938-45. Conveyors equipped with duckbills or other self-loading heads showed the largest gain, increasing from 346 in 1938 to 1,383 in 1945, or 300 percent. Scraper loaders in use dropped from 117 in 1938 to 87 in 1945, and pit-car loaders decreased from 1,392 to 142 in this period. Pit-car loader sales totaled 139 in 1938. During 1939-44, inclusive, only 18 sales were reported. The canvass of pit-car-loader sales was, therefore, discontinued in 1945. Conveyors in use, hand-loaded and self-loading combined, increased from 1,872 units in 1938 to 4,768 in 1945, or 155 percent.

Total mechanical loading units of all types in use at Pennsylvania anthracite mines increased from 2,376 in 1938 to 3,574 in 1945, or 50 percent, compared with an increase of 66 percent at bituminous and lignite mines during the same period.

Types of equipment purchased by regions—Table V gives the number of mobile loaders, scrapers and conveyor units shipped into various States and regions during 1946 and the number in use in 1945. West Virginia continued to receive the most mobile loaders, Pennsylvania, Kentucky and Alabama following in the order named. Pennsylvania anthracite mines received only 5 of the 495 mobile loaders shipped in 1946, but 32 of the 35 scrapers.

Conveyor units sold to Pennsylvania anthracite mines increased from 14 percent of the total conveyor sales in 1945 to 28 percent in 1946.

Haulage Equipment

"Mother" conveyors—For the purpose of this survey, a "mother," or haulage, conveyor is defined as a sectional extensibile power-driven convey-

Table IV—Sales of Mechanical Loading Equipment in 1946 Compared With Total Number of Machines in Active Use in Preceding Years

	Number of machines in active use, as reported by mine operators								Number of machines sold as reported by manufacturers in 1946
	1938	1939	1940	1941	1942	1943	1944	1945	
Bituminous and lignite mines:									
Mobile loading machines	1,405	1,573	1,720	1,985	2,301	2,525	2,737	2,950	490
Scrapers	117	131	116	109	93	83	87	87	3
Pit-car loaders	1,392	873	697	607	481	321	241	142	....[1]
Conveyors equipped with duckbills or other self-loading heads	346	559	656	788	1,062	1,226	1,331	1,383	....[2]
Hand-loaded conveyors, number of units	1,526	1,834	2,263	2,807	3,041	3,191	3,236	3,385	838
Anthracite mines (Pennsylvania):									
Mobile loading machines	....[3]	....[3]	....[4]	....[4]	....[4]	....[4]	....[4]	....[4]	5
Scrapers	545	535	547[4]	505[4]	524[4]	515	503[4]	568[4]	32
Pit-car loaders	....[2]	....[3]	....[5]	....[5]	....[5]	....[5]	....[5]	....[5]	....[1]
Conveyors equipped with duckbills or other self-loading heads	....[3]	....[3]	....[5]	....[5]	....[5]	....[5]	....[5]	....[5]	....[2]
Hand-loaded conveyors, number of units	1,831[3]	1,997[3]	2,189[5]	2,432[5]	2,491[5]	2,701[5]	2,807[5]	3,006[5]	319[2]

[1] Canvass of sales of pit-car loaders discontinued in 1945.

[2] Sales of conveyors equipped with duckbills or other self-loading heads are included with hand-loaded conveyors.

[3] Mobile loading machines, pit-car loaders, and conveyors equipped with duckbills or other self-loading heads are included with hand-loaded conveyors.

[4] Mobile loading machines are included with scrapers.

[5] Pit-car loaders and conveyors equipped with duckbills or other self-loading heads are included with hand-loaded conveyors.

ing unit that can handle over 500 ft. of conveyor. Main-slope conveyors are excluded.

Sales of "mother" conveyors were included in the survey for the first time in 1945, when 142 sales were reported. Sales in 1946 increased to 187, as shown in Table V. West Virginia received the largest number of "mother" conveyor units in 1946, followed by Wyoming, Pennsylvania, Kentucky and Illinois in the order named. No estimates of the capacities of these "mother" conveyors have been made and they are not included in the summaries of mechanical-loading equipment.

Trackless gathering equipment – Sales of shuttle cars, or rubber-tired self-powered haulage units, in 1946 were more than twice those in 1945. Deliveries were made in 14 States. West Virginia received the greatest number, followed by Kentucky, Pennsylvania, Illinois and Alabama in the order named. During 1945, 23 percent of the bituminous coal loaded by mobile loaders was handled by shuttle cars, and 4 percent was loaded onto conveyors as the first step in its transportation. The remainder of the mobile loader tonnage (73 percent) was loaded directly into mine cars.

Table VI gives the number of mobile loaders in use in bituminous coal and lignite mines by States and regions and types of loading in 1945. Of a total of 2,950,579 mobile loaders loaded into rubber-tired trucks or shuttle cars. A mobile loader that employs shuttle cars requires one to three cars. Therefore, approximately 1,100 shuttle cars were used in bituminous mines in 1945.

Mechanical Cleaning

Reports on sales of bituminous coal-cleaning equipment from 15 manufacturers show that installations were made in nine States in 1946, compared with 11 in 1945. However, the total capacity of 1946 installations was 78 percent greater than that of 1945—18,000 net tons of cleaned coal per hour in 1946, compared to 10,100 tons in 1945.

The report on one large sale made in 1945 was received too late to be included in sales for that year. However, it was included in 1946. Most of the equipment sold in 1946 will be placed in operation in 1947, although a few of these plants will not be completed until early in 1948. In terms of capacity, about one-third of the installations were additions to or replacements of equipment at mines that already had cleaning plants. The other two-thirds were made at mines that had no cleaning facilities. West Virginia ranked first in terms of capacity of sales made in 1946, followed by Pennsylvania, Illinois, Ohio and Indiana in the order named.

During 1945 about 87 percent of the total bituminous coal cleaned was cleaned by wet methods. Baum-type jigs cleaned approximately 42 percent of the total coal cleaned by wet methods during 1945. More than 90 percent of the capacity of the 1946 sales of cleaning equipment was for plants that clean by "wet" methods.

About 13 percent of the total bituminous coal cleaned in 1945 was cleaned by pneumatic methods. Less than 10 percent of the capacity of the 1946 sales of cleaning equipment was for plants that clean by "pneumatic" methods. Air tables cleaned approximately 59 percent of the total coal cleaned by pneumatic methods in 1945.

Table V—Comparison of Mechanical-Loading Equipment and "Mother" Conveyors in Actual Use in 1945 With Sales in 1946, by States and Regions

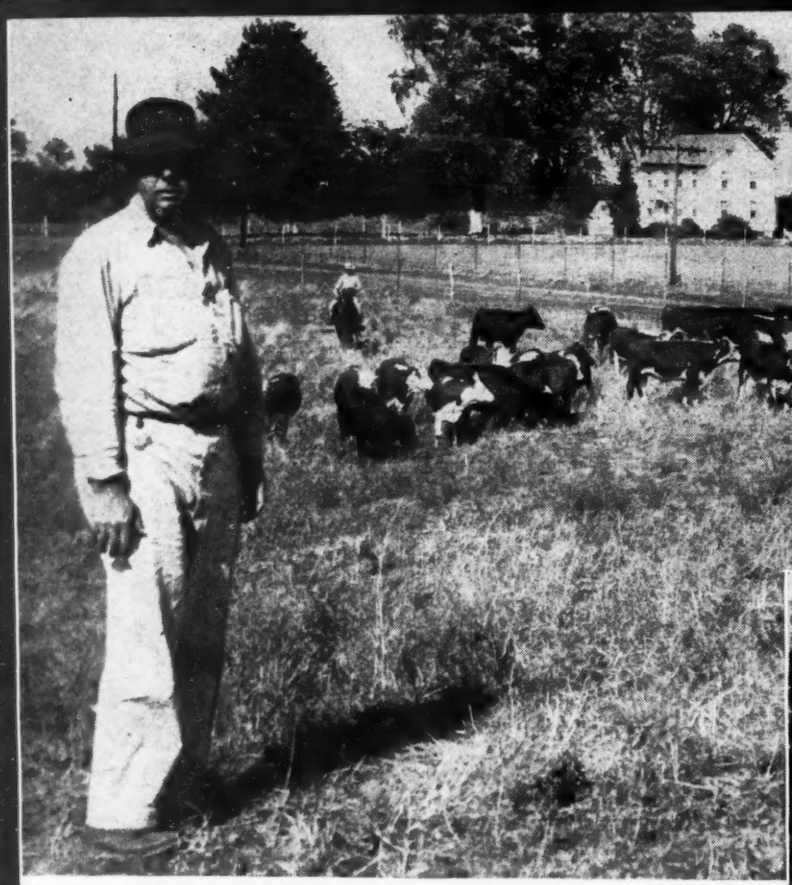
State and region	Mechanical loading equipment						"Mother" conveyors [2]	
	Mobile loaders		Scrapers		Conveyors [1]			
	In use in 1945	Sales in 1946	In use in 1945	Sales in 1946	In use in 1945	Sales in 1946	In use in 1945	Sales in 1946
BITUMINOUS AND LIGNITE MINES								
Northern Appalachian States:								
Maryland	....	....	....	....	31	5	....	....
Michigan	....	....	....	....	5	3	1	2
Ohio	174	22	....	....	155	35	23	10
Pennsylvania	651	90	13	....	822	123	92	29
Southern Appalachian States:								
Alabama	103	26	49	1	396	43	63	7
Kentucky	237	55	1	....	594	101	107	20
Tennessee	11	5	....	....	168	20	32	2
Virginia	78	11	....	....	127	24	8	10
West Virginia	764	216	2	1	1,395	377	270	51
Middle Western States:								
Illinois	570	23	....	....	26	9	27	14
Indiana	160	13	....	....	....	6	2	1
Trans-Mississippi States [3]	202	29	22	1	1,049	92	84	37
Total bituminous and lignite	2,950	490	87	3	4,768	838	709	183
ANTHRACITE MINES								
Pennsylvania	...[4]	5	568 [4]	32	3,006 [5]	319	...[6]	4
Grand total	...[6]	495	...[6]	35	...[6]	1,157	...[6]	187

[1] Includes hand-loaded conveyors and conveyors equipped with duckbills or other self-loading heads.
[2] Includes all haulage conveyors with capacity over 500 ft. except main-slope conveyors.
[3] Includes Arkansas, Colorado, Iowa, Kansas, Montana, New Mexico, North Dakota, Oklahoma Oregon, Utah, Washington, and Wyoming.
[4] Mobile loaders included with scrapers.
[5] Includes pit-car loaders and duckbills or other self-loading conveyors.
[6] Data not available.

Table VI—Number of Mobile Loaders in Use in Bituminous Coal and Lignite Mines, by States and Regions, Subdivided by Types of Loading in 1945

State and region	Number of mobile loaders			Total number in use
	Loading direct into mine cars	Loading onto conveyors	Loading into rubber-tired trucks	
Northern Appalachian States:				
Ohio	115	31	28	174
Pennsylvania	481	40	130	651
Southern Appalachian States:				
Alabama	27	51	25	103
Kentucky	143	9	85	237
Tennessee	2	....	9	11
Virginia	71	2	5	78
West Virginia	625	17	122	764
Middle Western States:				
Illinois	454	26	90	570
Indiana	117	....	43	160
Trans-Mississippi States [1]	141	19	42	202
Total	2,176	195	579	2,950

[1] Includes Colorado, Iowa, Montana, New Mexico, North Dakota, Oklahoma, Utah, Washington, and Wyoming.



Byron Somers shows his white-faced steers that graze exclusively on stripped land he has purchased and reclaimed. His home is in the background

These 1,000- to 1,100-lb. branded steers, photographed in September, 1946, as they loafed on the reclaimed strip land, weighed 600 to 675 lb. when they were purchased Oct. 10, 1945. Their only feed has been the grasses and legumes from this pasture, except for feeding with silage and clover hay for 2½ months.

UNLEVELED SPOIL

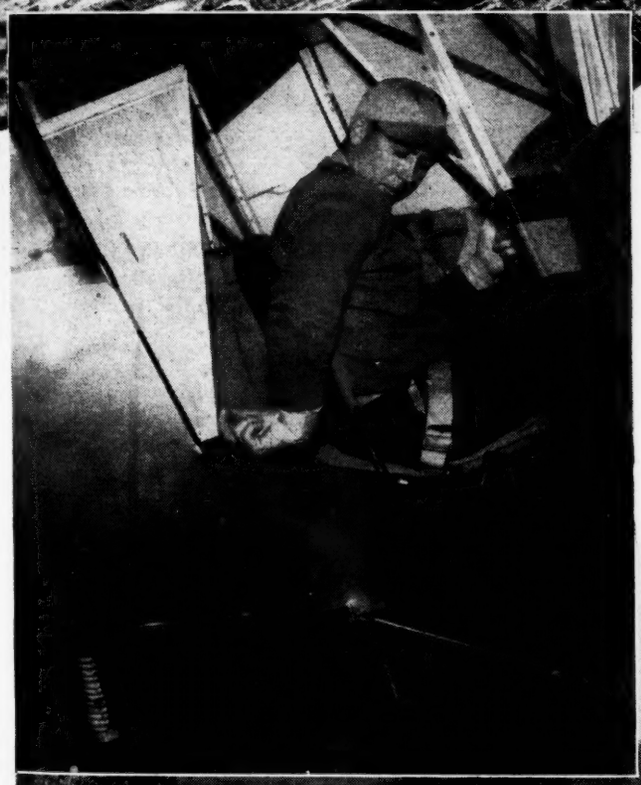
Brings Good Return as Farming Project

With 600 Acres Seeded for Pasture, Net Profit Was $9 per Acre in 1946—Nitrogen Built by Seeding Legumes With Plane — Cattle Grow Better Than on Adjacent Unstripped Pasture — Wild Life Profitable

By J. H. EDWARDS
Associate Editor, Coal Age

FARMING unleveled strip land on a large scale has paid off for Byron Somers, Fiatt, Ill., superintendent of the Red Ember mine of the Truax-Traer Coal Co. Net income from 600 acres in Fulton County, Illinois, has averaged $7 an acre annually since 1939. In 1945, it was $9 and promised to be substantially higher when the returns are in for 1946. In addition, the tract, with its grassy slopes, young volunteer trees and many bodies of water, affords Mr. Somers and his friends excellent duck and quail shooting, boating and fishing.

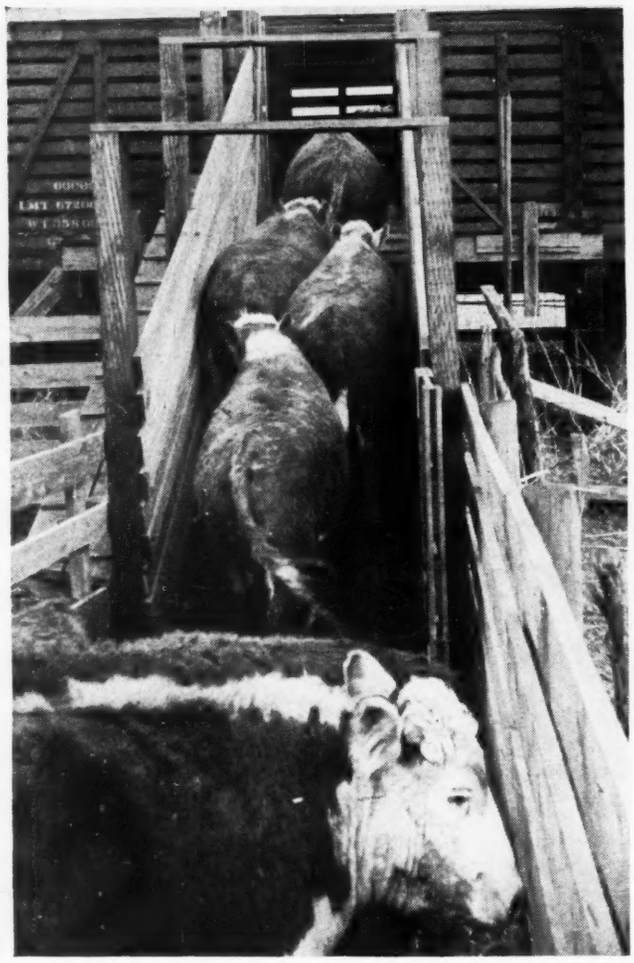
Starting in 1936 with the conviction that a profit could be made on unleveled strip land, Mr. Somers experimented with small tracts on the Truax-Traer property. These experiments proved successful and consequently he purchased 300 acres of stripped land from Truax-Traer in 1938 at $5 an acre. In 1941, he added an adjoining 300 acres at the same figure. Adjacent to this 600-acre tract of stripped land, Mr. Somers owns and farms 400 acres of unstripped, level farm land which he purchased in a badly run-down condition in the depression years. A farm manager supervises the entire operation and Mr. Somers, who puts in each day at his mining job as superintendent of the Red Ember mine, de-



This aerial view includes a large portion of the 600-acre strip tract purchased for reclamation by Mr. Somers. The lake, formed by damming the open cut in which the pit railroad was laid, is 2½ miles long, 100 to 200 ft. wide and 20 to 30 ft. deep. Numerous ponds supply drinking water for stock. Part of the six-mile access road comes in at the left and goes into the distance along the left bank of the lake. Land in the background has more trees because it was stripped earlier.

Seeding of stripped areas was done by airplane at a total cost, excluding the seed, of $3.21 an acre.

Seeded area photographed in June, 1945.



Above—Cattle on the way to market in March, 1946. Average weight was 1,246 lb. and they sold straight for the top price of $17.50 per hundred in Chicago. Of the profit of $95 per head, pasturing on the reclaimed land is credited with $63.43.

Top—Plenty of grasses and legumes, clear drinking water a few steps away, shade trees, ridges where they can get a breeze on a warm day and basins protecting them from cold winds make for contented cattle, rapid growth and good flesh.

Bottom—Six miles of access road was graded along the tops of the ridges. In this section, which was stripped in 1930, volunteer cottonwoods have grown so that they soon will shade the grass too much. Consequently, they will be cut for pulpwood in 1947, providing another source of income from the spoil banks.

votes only his spare time to the farming activities.

A. H. Truax, president of the Truax-Traer company, spent his earlier years in the wide-open spaces of Montana and the Dakotas and consequently has been sympathetic with Mr. Somers' objectives. Moreover, he has been in accord with the plan of operating the strippers at Red Ember so as to place a maximum of the clays and soil on top of the rock and shale ridges without adversely affecting the tonnage uncovered by the stripping units.

Part of the first 300-acre tract purchased by Mr. Somers had been stripped by the Truax-Traer interests in 1930. The last stripping on the second 300 acres purchased was in 1936. Cover ranged from 25 to 55 ft., with the average probably close to 45 ft. The company loaned Mr. Somers a bulldozer with which he prepared six miles of narrow access road through the lands.

Access roads, for the most part, have been made along the tops of the ridges and now are sodded and can be driven over with a car most of the year. Mr. Somers also built a dam at the end of the last cut, forming a lake 2½ miles long, 100 to 200 ft. wide and 20 to 30 ft. deep. The bottom of this lake was the bed for the mine railroad which hauled the last coal from the area. There are numerous ponds over the 600 acres.

Ponds Provide Water

The whole area has been seeded to pasture land and is proving excellent for cattle grazing. From the many ponds, the cattle get an abundance of clear drinking water without running their legs off. The ridges and basins afford a choice of grazing and loafing locations to suit the weather. In warm weather they rest on the tops of the ridges where there is a breeze and minimum annoyance from flies. In cold weather they take to the sheltered slopes and bottom of the basins.

Ninety-seven blooded white-faced Hereford steers pastured on the strip lands and then finish-fed in a drylot were sold by Mr. Somers on the Chicago market last March at a profit of $95 per head. Of that total, he credits $65.43 per head to grazing on the reclaimed land. These steers averaged 1,246 lb. and brought $17.50 per hundred, which was one of the highest prices paid that day for top-quality beef.

The steers were purchased in September, 1944, when they weighed 515 lb., and were grazed on the strip land, without supplemental feed, until the heavy snows of mid-January. At that time they were taken out of the strip lands and fed on silage and hay for two months. In the latter part of March, 1945, they were again put on the strip-land pasture, where they remained again until next Oct. 1. Five months of drylot feeding finished them for the March, 1946, marketing.

The top quality of these steers and the fact that they were grazed on strip lands drew favorable comment in the Chicago *Daily Drovers Journal* (March 21, 1946) and the Chicago *Tribune* (March 14, 1946). Articles devoted

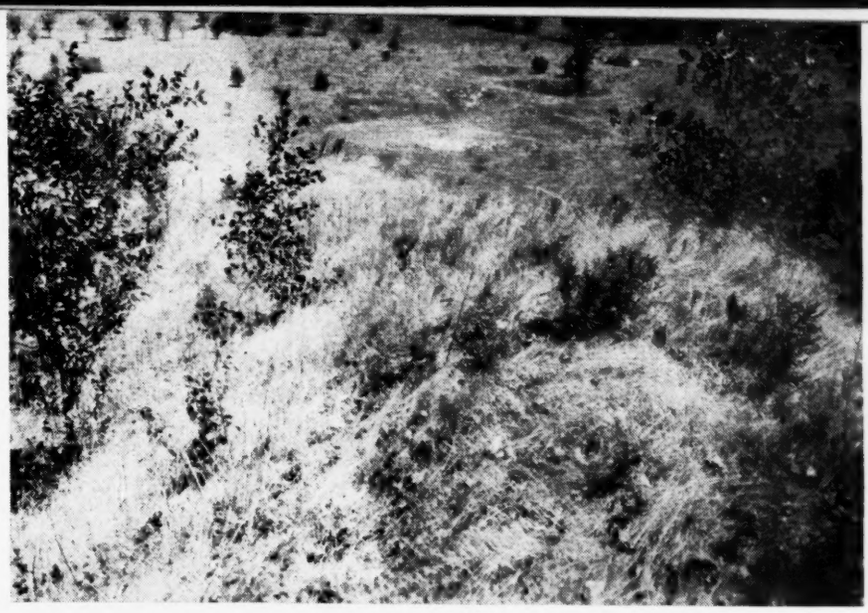
to or mentioning Mr. Somers' strip-farming success have appeared in the *Prairie Farmer* (Aug. 3, 1946), the St. Louis *Post-Dispatch* (Nov. 10, 1945) and *Harpers Weekly* (May, 1946).

How did Mr. Somers turn apparently worthless land into excellent pasture? The answer in part was in the strata moved to get the coal. At a typical point in adjacent strippings at Red Ember mine where the total cover is 49 ft., the strata, from the bottom up, are as follows: cap rock and hard slate, 2 ft.; shale, 30 ft.; clay and top soil, 17 ft. The shale has no value as soil. The clay is rich in the minerals but lacks nitrogen. The top soil, especially if it is on a run-down farm, lacks limes, phosphorous and other desirable minerals. In the stripping, a large part of the clay was placed on top and thus covered the ridges of shale and rock to a depth of several feet. Enough of the scattered cap rock and shale got mixed with the clay to add beneficially to its calcium content.

After the narrow roadways were graded through the land, they were seeded with bluegrass and red top by means of a disk harrow and harrow. Then, in 1938, the adjacent slopes were sown by hand with legumes and grasses. The former included sweet clover, alfalfa, red clover, alsike clover, white Dutch clover and lespedeza. The grasses included timothy, red top, orchard grass and brome. Many of these plants took hold and the next season 85 cows with calves were pastured on 300 acres of this land (April to December) without supplemental feed and came off fat. The pasture mixture growing on the virgin clay seemed to furnish a balanced diet.

Land Seeded by Plane

In recent years the seedings have been done by plane. Flying about 20 to 30 ft. over the tops of the ridges a small plane seeds a strip about 35 ft. wide. The seed pours from a nozzle in the bottom of the fuselage and the wind from the propeller does the scattering. The pilot is guided by men with flags. The Truax-Traer company now hires the same plane and is seeding pasture mix each spring on the 300 acres or so it has stripped the previous year. At the beginning of



Showing the contrast in pasture on stripped land and on unstripped land that has been deep-mined. The upper view shows the strip pasture with the unstripped in the background. The lower view is a close-up showing the condition of the unstripped land, including old deep-mining sink holes. Deep mining probably recovered 40 percent of the coal while stripping got it all.

One end of the artificial lake that wanders through the middle of the 600-acre strip farm is across the road from Mr. Somers' residence. Grass-fed steers loll in the background. The boat house contains equipment for fishing. Net profits from the muskrat catch pay the taxes on the 600-acre tract of reclaimed land.

At the left is the last cut in a Red Ember pit finished in 1946. The spoil area comprising the bulk of the center of the illustration will be seeded by plane in the spring of 1947. At the top at the extreme right is the vegetation-covered spoil seeded in the spring of 1946 on the 1945 stripping.

this program, 1,500 acres of the stripped land was sown in 26 hours at a cost of $3.21 per acre for labor and plane hire.

On his tillable unstripped farms adjacent to the strip pastures, Mr. Somers grows the corn, grain and hay for feeding his droves in the final dry-lot conditioning for top markets.

Spoils Grow Better Pasture

That the seeded banks of the stripped land grow better pasture than the flat unstripped land in its natural condition is evidenced by comparing areas at the edges of the strippings. In September, 1946, grass on the flat was short, skimpy and dry while that on the adjacent strip banks was luxuriant. Lack of water as a result of a natural run off to the creek was likely the principal reason for the poorer grass on the flat land. Lack of minerals is another. Experience indicates that yearling steers put on nearly 100 lb. more per season by grazing on the stripped land than on ordinary flat-land pasture in the same vicinity.

In 1941, cows, calves and steers numbering 273 were supported on the 600 acres of strip land plus an adjoining 150 acres of rough blue-grass flat pasture. The cattle grazed on the strip area showed a gain of nearly 25 percent more than those on the blue-grass pasture of the unstripped land.

Very little water runs off the Somers strip farm because the stripping was along lines corresponding generally with the contours. Erosion is not a serious problem because of the relatively short slopes the water travels to the local depressions. Questioned specifically on leveling, Mr. Somers said he would not give a nickel an acre for the land if it had been leveled. That, he said, would bare the unproductive shale and rock on the tops of the ridges, would provide a runoff for surface water and cause no end of difficulties from erosion.

An acre of the rough stripped land presents 15 to 20 percent more surface than a flat acre. Whether that means, other things being equal, it should grow 15 to 20 percent more feed is problematical. The north and south slopes do present differences of heat and protection which favor growing the variety of grasses and legumes that furnish a balanced diet.

The lakes and ponds are crystal clear and apparently not sulphurous. Vegetation abounds in the water along the banks and shore lines, thus supplying food directly and indirectly for fish and muskrats. Mr. Somers has realized approximately $300 during each of the last two seasons as his share of the muskrat catch, which sums paid the taxes on the 600-acre tract.

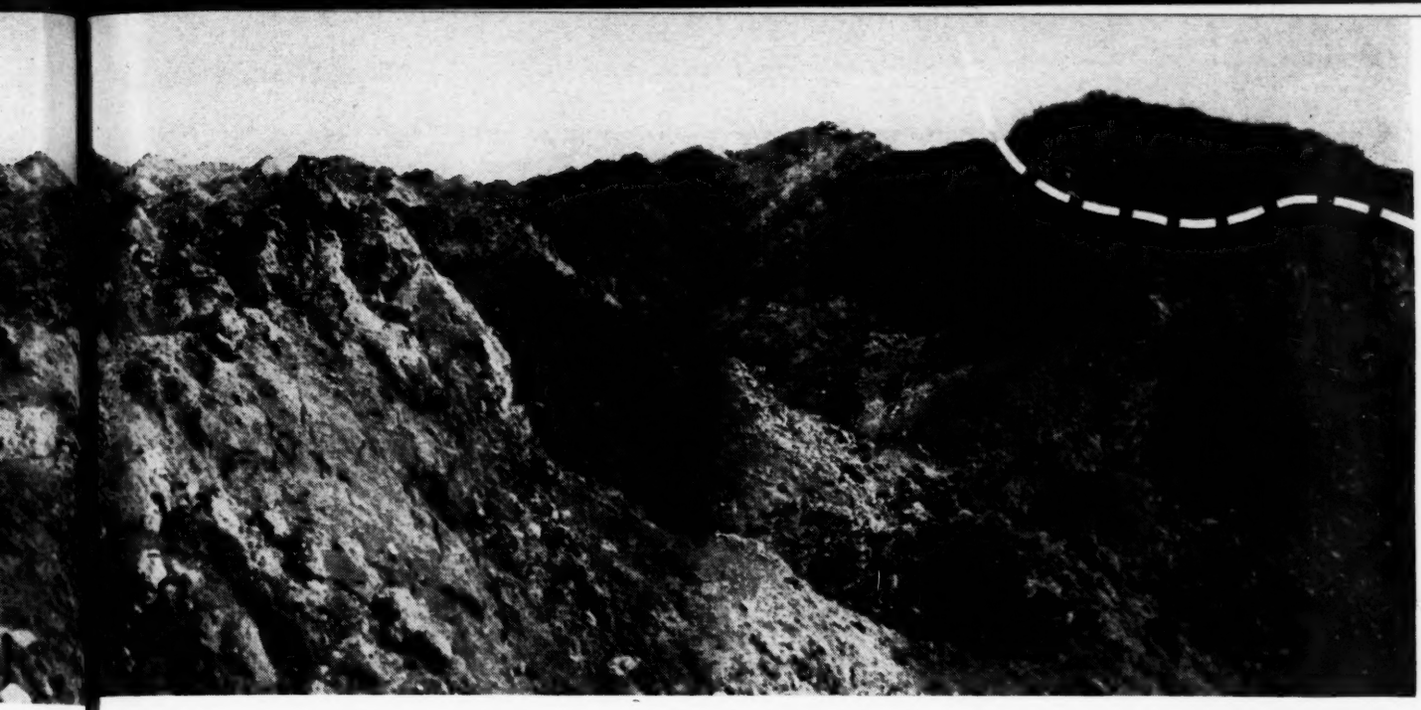
A few mink were caught and their pelts brought $20 to $30 each. The mink are considered a pest, however, and will be kept trapped to as near extinction as possible. Last year, eight 2½-lb. bull frogs were purchased from Arkansas and put into the ponds and lakes. Now the young ones, 3 to 4 in. long, are to be seen in many of the ponds. A harvest of frogs is in prospect for next year.

Many volunteer trees, especially cottonwoods, are growing on the area. On the part stripped in 1930, these cottonwoods are so numerous and of such size that their shade is beginning to adversely affect the pasture. It is the intention to cut the larger ones in the next year or so and to sell this pulp wood to mills in Havana 10 miles away and/or at Pekin 28 miles distant.

Mr. Somers' home is within a few hundred yards of the end of the lake on his stripped land. The home is also within one mile of the public square of the town of Canton. At that near

Numerous young bullfrogs can be seen about the ponds, the result of planting eight 2½-lb. frogs purchased in Arkansas in 1945. The frog crop will be ready for harvest in a year or two.

This four acres adjoining the strip-land lake rents to a gladioli grower for $50 per acre because of the excellent irrigation water he gets from the lake.



end of the lake he has a boat house where he keeps the equipment for fishing at his convenience. Bass, blue gills, crappie and brown trout have been stocked and bass weighing 3 lb. were caught recently. Parts of the lake, where it cuts through the ends of the ridges, present an indented shore line so pleasing to the eye that it reminds one of the Dells of Wisconsin.

Lake Adds to Revenue

The water from this lake brings Mr. Somers an additional return through rental of 4 acres of adjacent flat ground to a gladioli grower for $50 per acre. The renter furnishes his own pumping plant and power to irrigate the patch. He rates the water as containing minerals promoting the growing of superior flowers.

Wild ducks frequent the lake and ponds during spring and fall. For several years, a flock of 10 geese has stayed for several days to several weeks on the lake. Ducks can be hunted without decoys because they often frequent the smaller ponds and can be jumped by walking over the adjacent ridges.

One question is whether the strip pasture land has any precipices or slopes so steep that heavy cattle are likely to fall down them and get hurt. The answer is no. The slopes are not that steep and moreover cattle are surer footed than most people would guess. Only the highwall side of the finish cut is so steep that cattle must be fenced from it and that wall is on the outside boundary of the area.

Red Ember mine, of which Mr. Somers is superintendent, produces 6,000 tons of strip coal per day from the No. 5 seam, 4½ ft. in thickness,

At this point in the present Red Ember stripping work, the 49 ft. of cover consists of 2 ft. of cap rock and slate, 30 ft. of shale, 14 ft. of clay and 3 ft. of black soil.

lying practically level and under cover ranging between 20 and 75 ft. One of the two pits is stripped with a shovel working in combination with a dragline. The former is a 750 Bucyrus-Erie unit with 17-cu.yd. dipper, 62-ft. stick and 95-ft. boom. The dragline, of the same make, is a 375B with 10-cu.yd. bucket and 150-ft. boom. The latter handles the 18 ft. of clay and top soil and for the most part deposits it on top of the rock and shale, which is dug by the shovel.

The other pit is stripped with a Bucyrus-Erie 950B shovel with 30-cu.yd. dipper, 72-ft. stick and 108-ft. boom. As far as practicable, this shovel places the rock and shale at the bottom of the spoil bank to form a buckwall and then casts the clay on top of the ridge. Loading the coal into trucks is done with 7- and 5-cu.yd. shovels. From a combination transfer station and railroad loading tipple, from which 1,000 tons of coal is shipped directly, about 5,000 tons is hauled three miles over the company's own standard-gage railroad to the washing plant near Fiatt. Production goes to industrial plants exclusively.

The stripped land which the coal company has seeded by plane is being offered to surrounding farmers for grazing, rent free. The only stipulation is that they build fences around the areas they wish to pasture.

HIGH PRODUCTIVITY

Goal in Maintenance at Kenilworth Mine

Good Records and Heading Off Trouble Cut Delays to Less Than 2 Percent of Scheduled Working Time — Running Repairs Aided by New Underground Shop—Unit Production Determines Overhaul

COMPREHENSIVE REPORTS, prompt action to forestall serious failures and the sub-assembly method of maintaining machines are among the maintenance principles that keep mechanical and electrical delays to approximately 2 percent of scheduled working time at the Kenilworth mine of the Independent Coal & Coke Co., Kenilworth, Utah. Operating in a seam pitching 10 percent, production is accomplished with crawler loaders, track loaders and shaker conveyors with self-loading heads, supplemented by track cutters on which are mounted coal drills and by shortwall cutters, post drills and 8- and 10-ton cable-reel locomotives. Hoists take care of haulage on the inside slopes, while 15-ton locomotives handle trips of 5-ton steel cars with anti-friction bearings to the outside.

Major productive equipment of Kenilworth mine consists of five crawler loaders, four track loaders, seven track cutters with drills, nine short-walls, 15 post drills and 25 locomotives, including two battery units and four 15-ton main-line units. All main-line locomotives have been equipped with dynamic braking for added safety in controlling speeds of trips through a rock tunnel 8,250 ft. in length, double-tracked, on which the average grade is 1¾ percent in favor of loads. Shoes, which are automatically released at the end of the loaded run, are used under the front cars. To permit dynamic control at all times, power to energize the control circuits is supplied by a 32-volt battery, thus permitting dynamic operation should there be no power on the trolley wire.

Records and Inspections Pay Off

Thorough-going records plus daily and twice-daily inspection and preventive repairs are the foundation of maintenance work at Kenilworth mine. These are backed up by an outside, or main, shop fully equipped for complete overhauling and a new inside shop also adequately equipped and arranged to make major repairs. Extra productive equipment is now being provided which will be utilized as stand-bys to maintain tonnage in case of failures.

Records start with a "Daily Loader Report" and a parallel report on maintenance and repair work done. The daily loader report (see accompanying illustration) shows the number of men working, places loaded and cars produced, along with delays broken down into 15 classifications. Where the section boss cannot supply the data, as in the case of tipple delays, it is entered by the company time-study engineer. The report also has space to record repairs needed and for explanation of delays. Another report, also illustrated, is provided for conveyor units.

From the daily loader and conveyor reports, one copy of which goes to the time-study engineer, Carl J. Empey,

REPORT OF MECHANICAL DELAYS

DATE_____

TO: INSIDE SHOP

S = Shovel

M = Motor

The following mechanical delays were taken from reports_____

No.	Equip-ment	Delay Minutes	NATURE OF DELAY
	TOTAL		

REPAIRS NEEDED

No.	Equip-ment	NATURE OF REPAIRS NEEDED

SIGNED_____

DATE SECTION

EQUIPMENT NUMBER

INSIDE SHOP OUTSIDE SHOP

REPAIRS TO BE MADE

OPERATOR FOREMAN

Taken off the daily loader and conveyor reports, this form (at the left) goes to the maintenance department each day to guide repairmen in keeping machines always ready to operate. To insure immediate attention when necessary, bosses can use this special repair order (above).

DAILY LOADER REPORT

DATE_____ ENTRY_____ LOADER_____ OPERATOR_____ DAY_____ NIGHT_____

MEN IN SECTION	NO.	PLACES LOADED	No. of Cars	Empty Delay	Derails	Track	Power	Cable	Faces	Preparation	Move Equipment	Loader Breakdown	A.U. Breakdown	Locomotive Breakdown	Miscellaneous	Hoist	Water	Tipple	REPAIRS NEEDED:
SECTION BOSS																			
SHOT FIRER																			
OPERATOR 7 A.U.																			
HELPER 7 A.U.																			
SHOVEL OPERATOR																			
SHOVEL HELPER																			
SHOVEL FACEMAN																			
DRILLER																			
MOTORMAN																			
NIPPER																			
BRATTICEMAN																			
TRACKMAN																			
TIMBERMAN																			
TOTALS		TOTALS																	

DELAYS MUST BE EXPLAINED BELOW:

SECTION BOSS

DAILY REPORT OF CONVEYORS

CONVEYOR_____ SECTION_____ OPERATOR_____ DATE_____ DAY_____ NIGHT_____

NUMBER OF CARS LOADED_____

MEN IN SECTION	NO.	DELAYS	MIN.	EXPLANATION OF DELAYS
SECTION BOSS		WAIT ON EMPTIES		
OPERATOR 35 B.B.		DERAILS		
HELPER 35 B.B.		CUTTING MACHINE BREAKDOWN		
OPERATOR DUCKBILL		DRILL BREAKDOWN		
CONVEYOR FACEMAN		CONVEYOR BREAKDOWN		
LOADER HEAD MAN		LOCOMOTIVE BREAKDOWN		
TRACKMAN		CABLE		
TRACK HELPER		POWER		
MOVING CONVEYORS				
TOTAL.....		TOTAL.....		

REPAIRS AND SUPPLIES NEEDED:

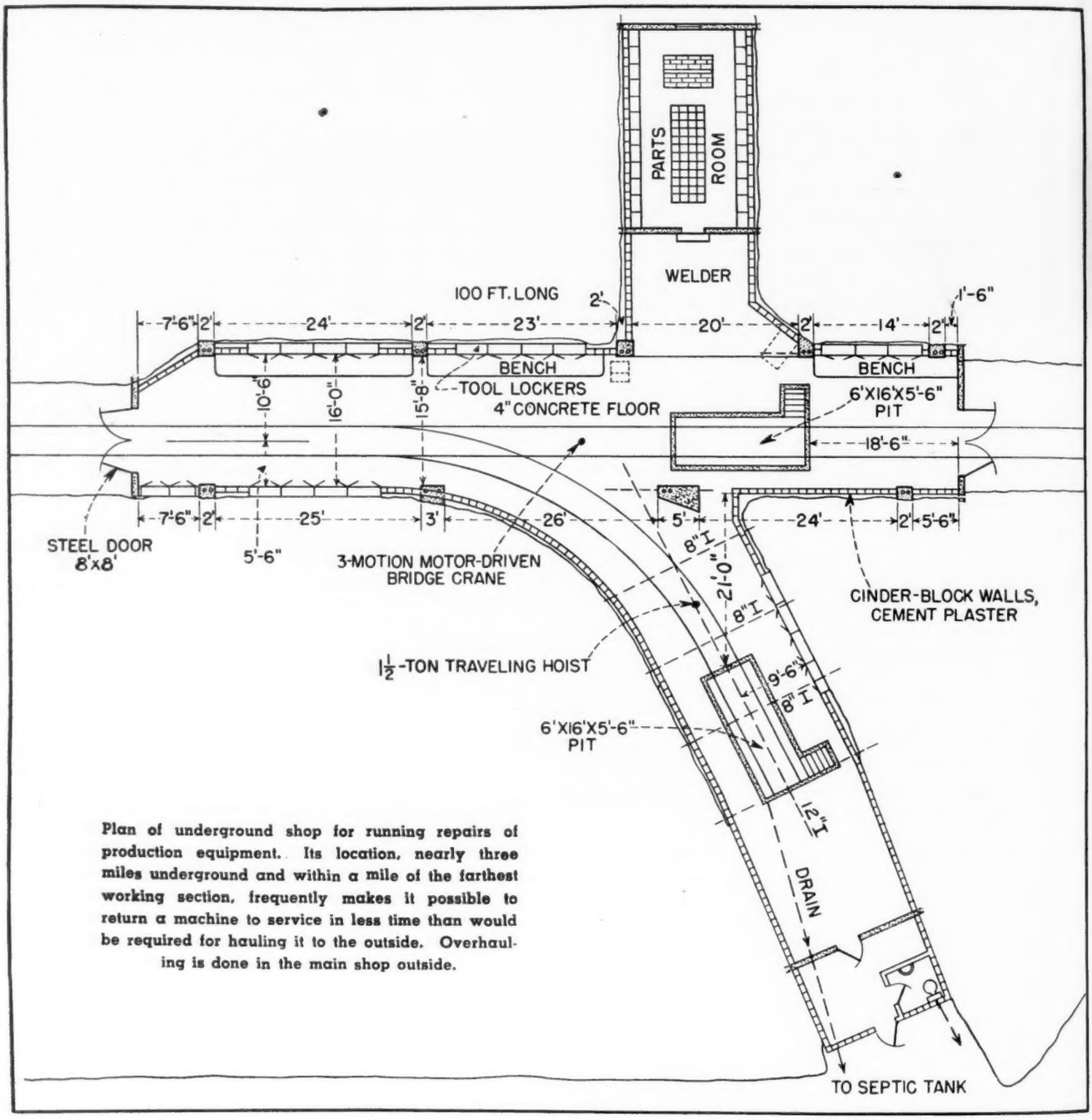
SECTION BOSS:

Mainstays in maintenance at Kenilworth—"Daily Loader Report" (top) and "Daily Report of Conveyors" (bottom). With parallel reports on maintenance and repair work done, these reports enable management to keep track of each individual machine, get repair work done when needed, schedule overhauls and determine performance in relation to cost of maintenance.

and another to the master mechanic, W. C. Painter, work orders are taken off at the end of the shift so that machines can have the necessary attention without delay. These work orders go to the repairmen immediately. If special attention is necessary, the section boss can leave a special order, shown in an accompanying illustration, at either the inside or outside shop to insure that the equipment in question gets attention the first thing.

The daily loader and conveyor reports are used also to make up a daily delay report for each loading unit, copies going to the master mechanic, to George B. Jackson, general superintendent, and to the general manager in the main office of the company in Salt Lake City. Contents of all reports receive close attention and are acted upon by E. O. Jackson, mine superintendent.

The daily loader and conveyor reports also figure in making up monthly summaries of production by units, tonnage lost (on the basis of one ton per minute), production per man and other pertinent information, including section conditions, rock dusting, etc.



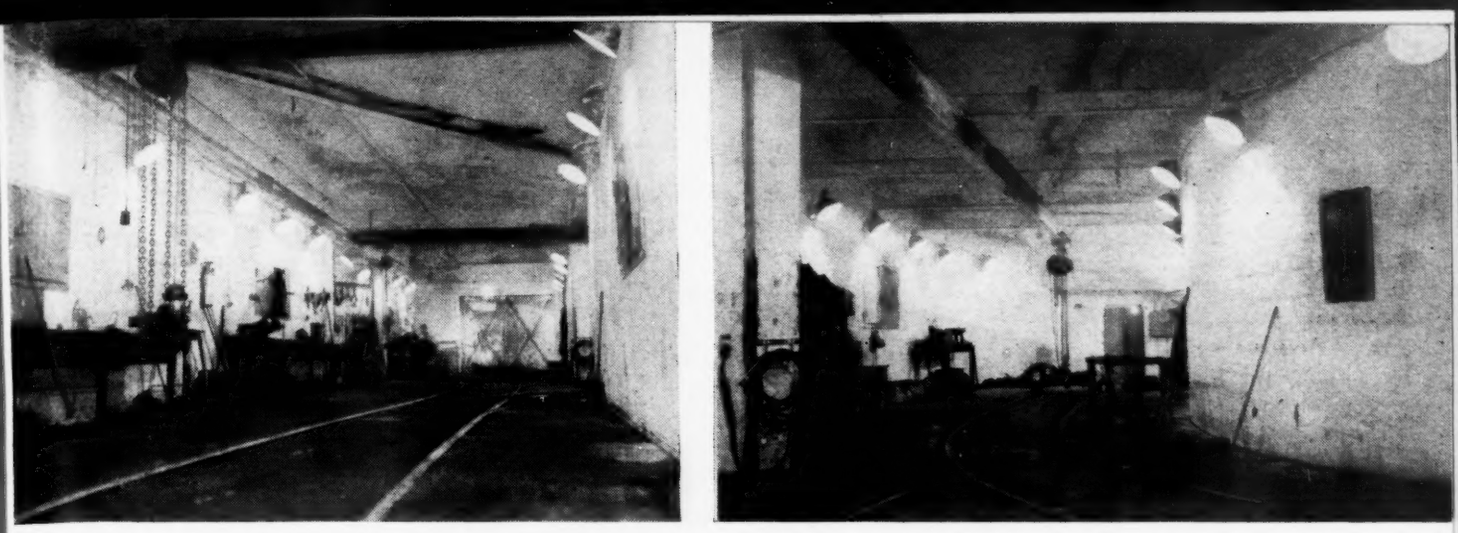
Plan of underground shop for running repairs of production equipment. Its location, nearly three miles underground and within a mile of the farthest working section, frequently makes it possible to return a machine to service in less time than would be required for hauling it to the outside. Overhauling is done in the main shop outside.

These summaries are embodied in a special report made by the time-study engineer, who also figures out productivity per unit each day. In addition to the superintendent, all foremen receive copies of the monthly analyses—and certain pertinent figures, particularly tons per man, are posted daily for the benefit of the entire mine force. This posting of unit tonnages, on a blackboard at the lamp house, has proven a valuable incentive and stimulus to healthy competition.

Tonnage and delay reports, as previously noted, are paralleled by reports on repairs made and their cost. These reports go to the master mechanic. Each machine is given a number, which simplifies accounting and assures an accurate and complete check of expenses chargeable to individual units.

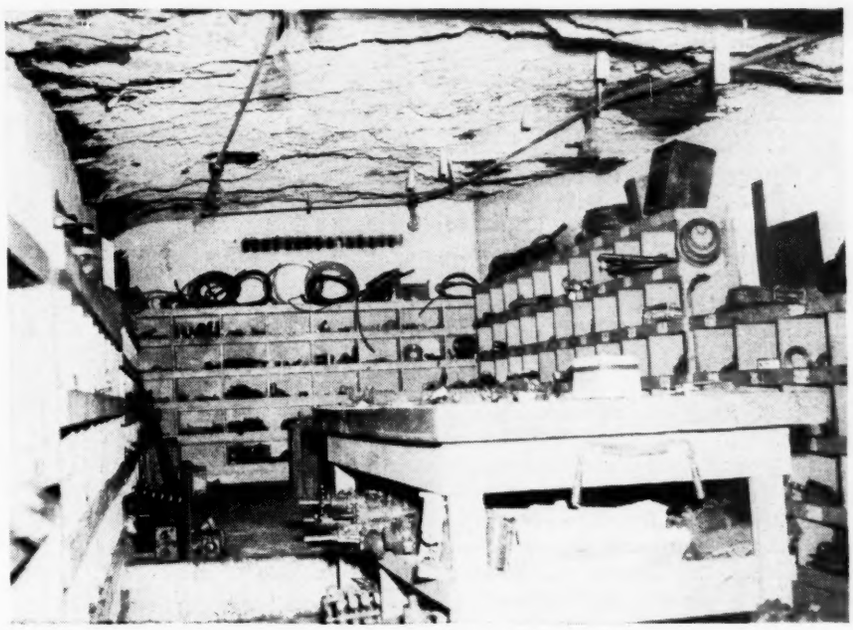
Tonnages loaded, holes drilled, etc., are the main factors in deciding when to replace parts and when to overhaul. Through the reports of production and costs of making repairs, which are kept on file cards in the master mechanic's office, it also is possible to determine at any time how much money has been spent on a unit in relation to its output. Among other things, this enables the master mechanic and other officials to tell when a machine is being abused and also if there was poor workmanship in repairing or overhauling by the mechanics.

To sum up, the reports on production, delays and costs of repairs indicate when repairing and overhauling are needed and show also how much is being laid out on any particular machine. For example, the card record shows who put a part or assembly in a machine, what he did, where the part previously was used and how long it was in service in the latest unit. Records of this kind have practically eliminated trouble with such equipment as the tramming motors on track cutters because accumulated data show how long they normally should be used and, therefore, they can be taken out and given attention before a breakdown occurs.



At the left is the main bay in the underground repair shop at Kenilworth. It includes two overhead cranes and a pit. The right-hand view shows the branch bay with monorail crane and pit.

A constant check is kept on machine condition by mechanics from the inside shop, who patrol given sections once or twice a day. Each man confines his attention to the same territory and gives each machine a thorough check at least once a day. The mechanics also check on lubrication by the operators to make sure that it is done. The operators use grease guns and volume guns. Since the aim at Kenilworth is not necessarily a high tonnage per unit, but rather an average high tonnage per man, this approach allows for taking the time for careful inspection and good lubrication. Toward the end of the week, the mechanics prepare for the more urgent repairs and spend the remainder of the time on additional inspection and other necessary maintenance or repair work.



A small parts store room supplements repair facilities in the underground shop.

Outside Shop Does Rebuilding

All complete overhauling, as noted, is done in the outside shop, the machines being brought out for that purpose. As a rule, the machine is taken completely apart and chassis and other repairs are made as necessary. Then the job is completed by installing assemblies, those replaced then being worked over and made ready for use on the next machine. This system expedites the job of complete overhaul and also the work of servicing those units that are not functioning properly but are not yet ready for general overhauling.

Except for overhauling or the installation of a sub-assembly, running repairs are made in the mine—either in the underground shop or in the working place. Formerly, if such repairs required removal of a heavy part of assembly, it was necessary to bring the machine four miles or more to the outside shop where there were lifting and other facilities adequate for the job. Since the vertical clearance in the main-haulage tunnel is not sufficient for the use of trucks in moving heavy equipment and, to avoid tramming or pulling the unit the entire distance which, in many cases, would be injurious to the machines and a severe source of delay, the underground shop was built and adequately equipped.

The new underground shop is centrally located nearly three miles underground and is within a mile of the farthest working section. With the exception of drills, no overhauling is done, the shop being strictly for repair and replacement work requiring, say, an hour or two and such facilities as a crane or chain hoist. Thus, a machine frequently can be returned to service in less time than would be required for hauling it to the outside.

A plan of the shop is shown in an accompanying illustration. The coal was cut with a track machine and was trimmed up to the rock—about 15 ft. A concrete floor 4 in. thick was poured and walls of cinder block were built to the top. Beams (80-lb. rail) for roof support and for cranes and hoists were hitched into the coal.

In addition to a drill-overhauling section, the shop includes a drill press, 300-amp. arc welder, gas-welding and cutting equipment, metal-cutting saw, cable vulcanizer, work benches, tool lockers, two 6x20 by 5½-ft.-deep pits with drains, one 1½-ton chain hoist traveling on a center rail over one pit in one bay and two bridge cranes, 1½-ton and 5-ton capacity, in the main bay, which also contains another pit of the same size. The shop is furnished with a toilet separately housed and a septic tank which drains into old, sealed works; a supply room containing parts necessary for most underground repair work; and a 110-c.f.m. air compressor in a separate room of its own outside the main entrance. Illumination is provided by 2,500-lumen incandescent lamps in porcelain reflectors near the ceiling on all walls.

TIMBERING MACHINES

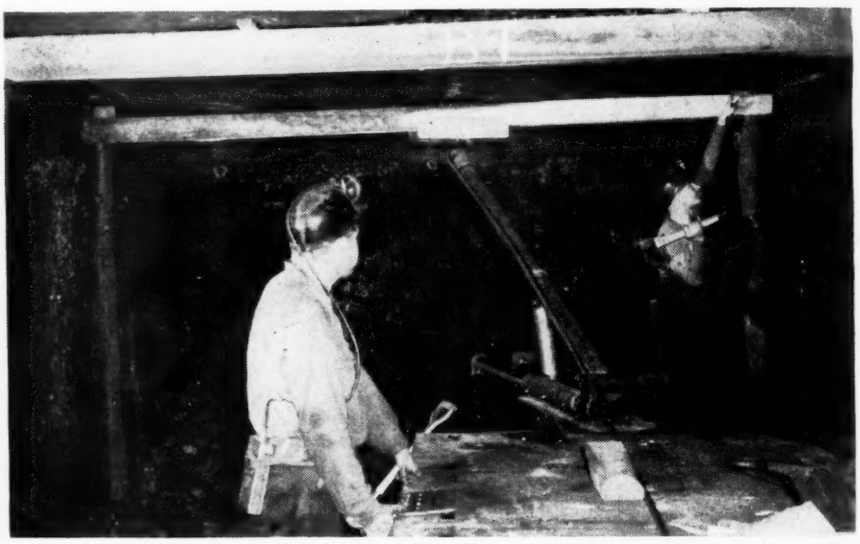
Cut Cost and Promote Safety at Isabella

New Machine Developed in Three Years of Experimentation Permits Two Timbermen to Do Work of Four — All Operations Hydraulically Powered — Timbering Made Safer — Supplies Carried in Trailer Cars

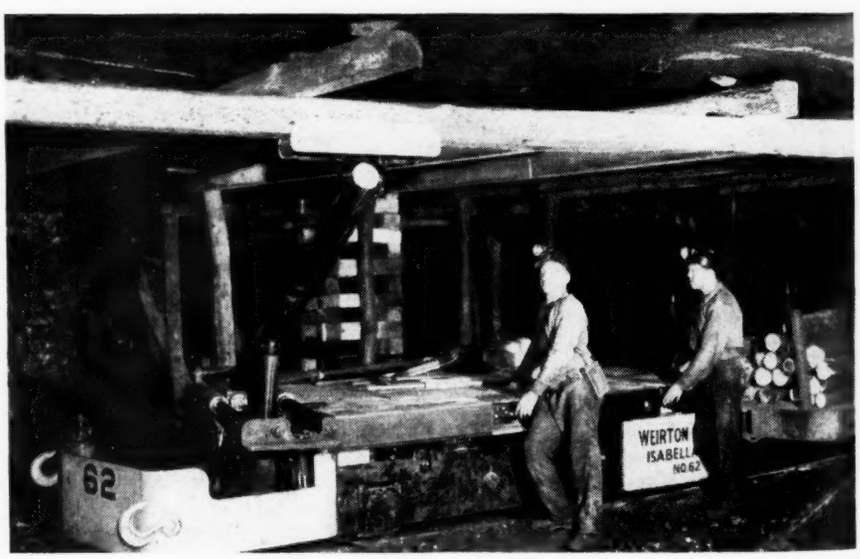
By RALPH R. RICHART
Associate Editor, Coal Age

INSTALLATION of track-mounted timbering machines at the Isabella mine of the Weirton Coal Co., Isabella, Pa., enables two-man crews to do work previously requiring four timbermen and permits timbering as many as 16 places a shift—faster and with greater ease. Equipped with a hydraulically operated boom and a disk saw, the machine is accompanied by its own supply of timbers on a trailing car.

The present unit is a revised model and is the result of experimentation covering about three years. The first model, built jointly by the Weirton Coal Co. and the Greensburg Machine Co., Greensburg, Pa., has been in service 16 months and formed the basis for the design of the present machine. Eventually, all seven loading sections at Isabella will have this machine as standard equipment. It will permit the crews to be reduced from 16 to 14 men. Jeffrey 56A track-mounted drills in each section with the timbering machines, have been equipped with a hydraulic feed for moving the turntable, permitting operation with one man instead of two. This type of drilling equipment is standard in all loading sections in the mine and reduced the section crew from 17 to 16 men. Details will be the subject of another article scheduled for early publication. With the completion of the change in timbering methods, the loading crews will be reduced by two additional men, from 16 to 14.



The boom of the timbering machine holds the crossbar until all wedging is completed.



The boom has a horizontal sweep of 180 deg.

The frame of the timbering machine is 62½-in. wide, 15 ft. long and stands 30 in. above the rail. The wheelbase is 60 in. and the track gage is 44 in. The 7-ton machine has a maximum speed of 4.5 m.p.h. and can operate on grades up to 10 percent. In tramming, the driving force is transmitted to both axles and the chassis is equipped with a double equalizer and rubber-mounted transmission. One 15-hp. motor drives two pumps serving two separate hydraulic systems, making the machine 100-percent hydraulically operated. The unit is equipped with Timken bearings throughout. It will timber 10 ft. 5 in. beyond the end of the rail.

The boom has a capacity of 1,000 lb. and is positioned through a boom-

lifting cylinder, a boom-extension cylinder, two boom-swinging cylinders and, if need be, by tramming the unit. On the end of the boom is a 10-in. swivel saddle for holding a sawed timber. The boom can raise the timber 11 ft. 4 in. above the top of the rail. In the lowered position, the base of the saddle is 39¾ in. above the rail. The boom will swing through an arc of 180 deg. or to right angles to the track on either side. In the returned position, the center of the saddle is 29 in. from the end of the bumper. The boom-extension cylinder will move the boom out 36 in.

The 24-in.-diameter disk saw for sawing crossbars and posts is located near the back end of the machine. It has a shaft speed of 1,500 r.p.m. and will cut through a 10¾-in. timber.

Pushbuttons Control Motor

The 15-hp. 250-volt-d.c. 850-r.p.m. Louis Allis permissible motor, directly connected to the two hydraulic pumps, is controlled from a pushbutton-operated magnetic starter. One 500-lb. pressure pump operates the cable-reel motor, boom-lifting cylinder, boom-extension cylinder and the two boom-swinging cylinders. Both the lifting- and boom-extension cylinders may be operated simultaneously. Should the power go off or an oil line develop a leak, the boom will, if holding a crossbar in place, continue to do so. However, the boom may be lowered by opening a valve to bleed off the oil. The cable reel accommodates 475 ft. of No. 4 parallel-duplex cable. Guide rollers are mounted atop stanchions placed on one side of the trailing supply truck for supporting the trailing cable. While the machine is operating from the cable, the trolley pole is dead.

The 1,000-lb.-pressure hydraulic pump serves the disk saw and also propels or trams the machine along the track. Sawing can be done by one man who uses his left hand to hold the timber and his right hand to control the saw. As soon as the control handle is raised the saw comes up to speed and then begins to raise. The upward stroke of the saw is adjustable through a flow-control valve. When the operator releases the handle, the saw quickly stops rotating and returns to its traveling position within the frame of the machine. Tramming and sawing are interlocked so that only one can be done at a time.

Two hydraulic traction-control valves operating a hydraulic controller are mounted in the cab of the machine for tramming. One lever controls the direction of travel and the traveling rate up to one-third speed, or 1.5 m.p.h. A

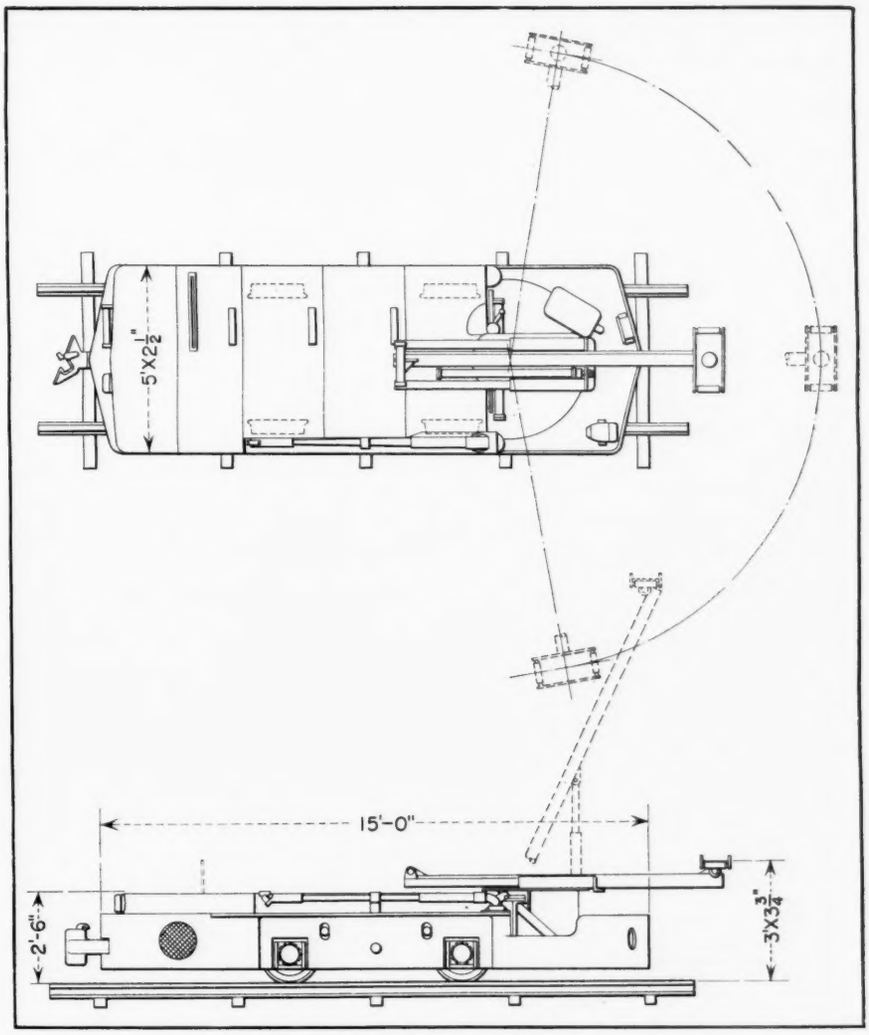
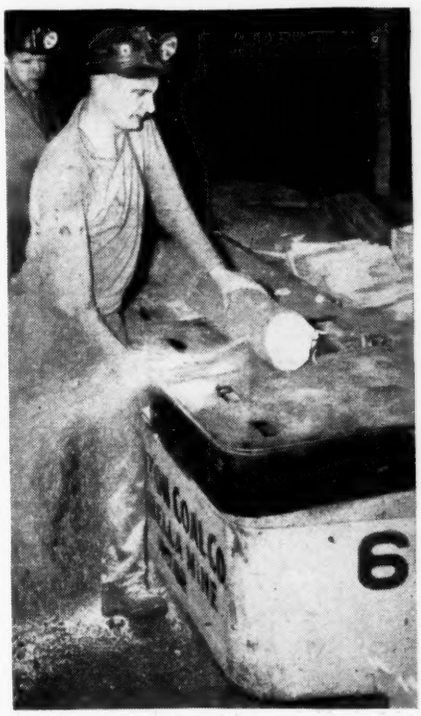
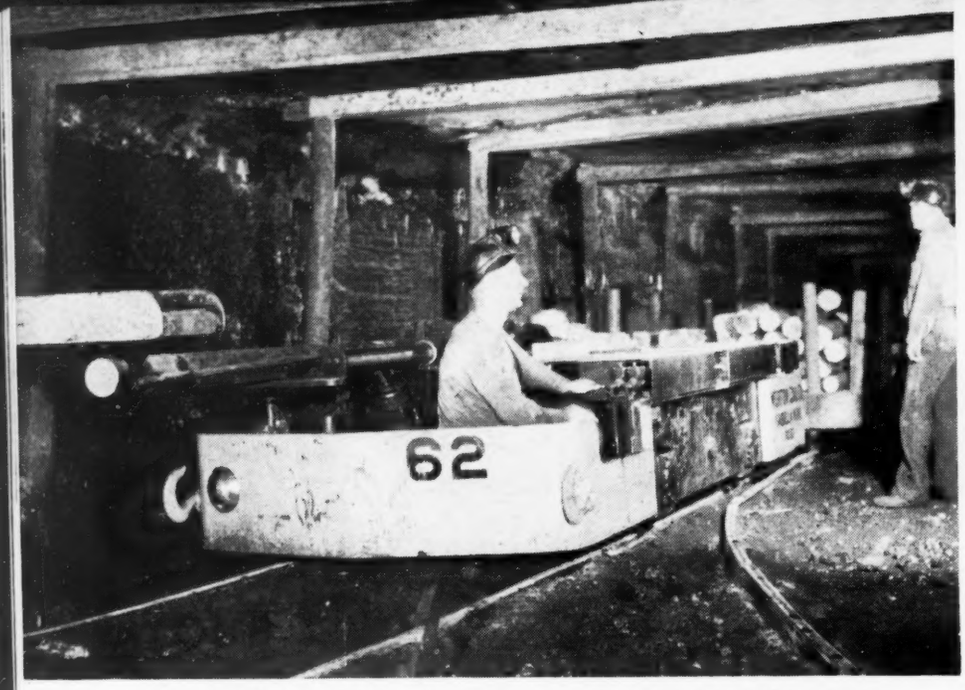


Fig. 1—Plan and elevation of the timbering machine.

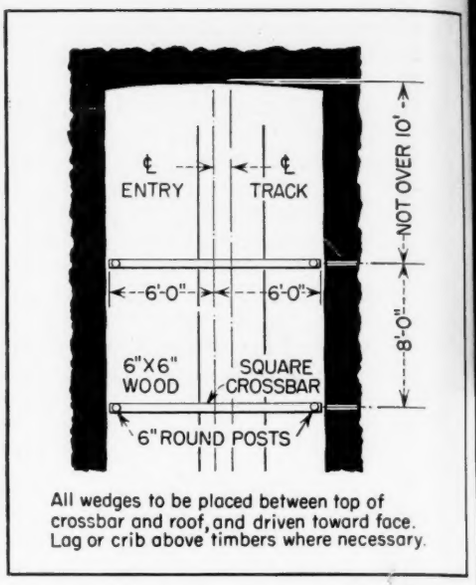


The cut-off saw makes quick work of the sawing assignment in timbering.

Both men steady a prop while it is being sawed to the length required.



Timbering machine and supply car ready to move to another room.



All wedges to be placed between top of crossbar and roof, and driven toward face. Lag or crib above timbers where necessary.

Fig. 2—Standard plan, minimum timbering, 12-ft. entry, normal roof conditions.

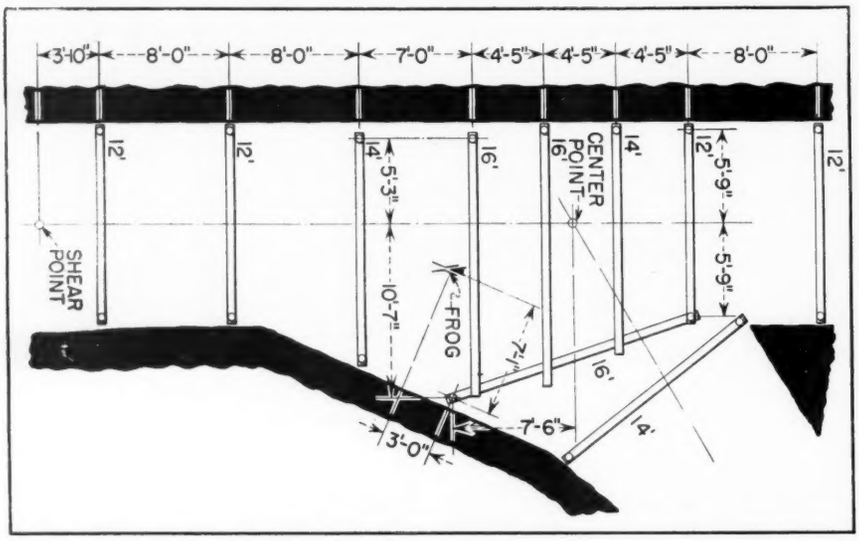


Fig. 3—Plan of minimum timbering at a 60-deg. right-hand intersection where normal roof conditions are encountered.

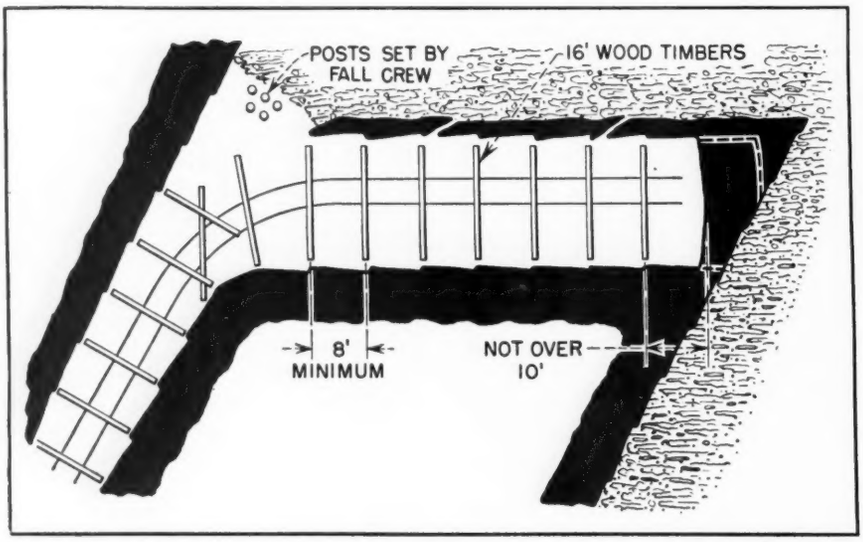


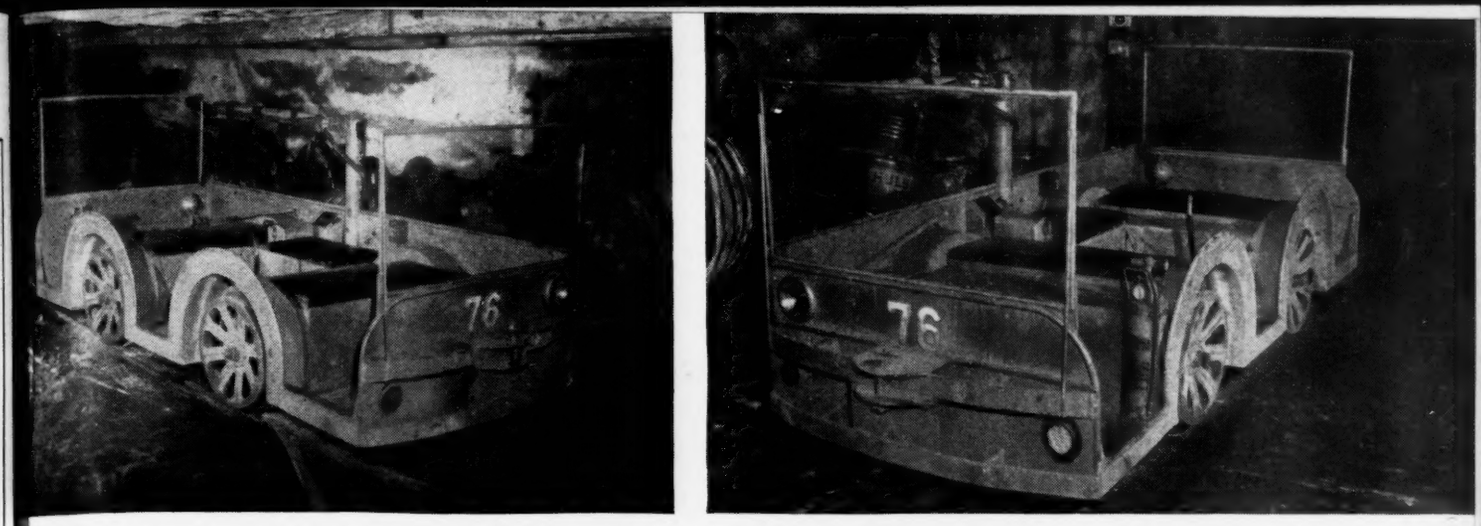
Fig. 4—Plan of minimum timbering for a typical 18-ft. 60-deg. lift when the normal roof conditions are present.

second lever is used for one-third and up to full speed, or 4.5 m.p.h. The machine can be made to travel at any speed from zero to 4.5 m.p.h.

Two independent braking systems are used on the timbering machine, mechanical and hydraulic. The mechanical brake is used only in the standing position. The instant the hydraulic control lever reaches the off position, the hydraulic brake is applied. There also is a separate hydraulic sander for each of the four traction wheels.

A major advantage of the timbering machine is reduction of the hazards to which men are subjected while setting timbers. With the timbering machine, the present procedure in rooms is to lay a 6x6-in. by 12-ft.-long sawed crossbar in the saddle on the boom and raise it in place against the roof. With the bar held tight against the roof by the machine, both the timbermen are free to clean out and take measurements for the posts. The posts are sawed to length on the back end of the machine where a square cut is assured if the post is properly positioned. Afterwards, both men can be setting up a prop at the same time.

Under the old method, where four timbermen were needed for each loading crew, every operation was a manual one. Timbering supplies (crossbars, posts and wedges) were concentrated in piles throughout the territory. With this old arrangement, the final delivery of the timber to the spot where it was to be used was by means of hand-pushed trucks involving heavy pushing for 600 to 700 ft., often on grades up to 3 percent or more.



Rear and front views of the mine jeep, with Plexiglas windbreakers, used by the shop maintenance crew. It operates from either a trolley or storage battery supply and increases the crew's effectiveness.

ISABELLA PERSONNEL

G. M. Rigg, Manager
George N. McLellan, Superintendent
C. W. Lotz Jr., Mining Engineer
W. D. Heller, Master Mechanic
E. B. Jolly, Chemist
G. L. Kemp, Chief Electrician
J. L. Willetts, General Mine Foreman
William Keeney, Night Mine Foreman
Peter Serinko, Chief Asst. Mine Foreman
Roy Dayton, Chief Asst. Mine Foreman
John Novotny, Chief Asst. Mine Foreman

George N. McLellan (left) is superintendent at Isabella. Peter Serinko (right), one of the three chief assistants, has a private mine jeep.

Now that the timbering operation has been semi-mechanized through the use of the timbering machine and the trailing supply car, the picture is quite different. Supplies now are delivered in car-load lots and, of course, do not have to be unloaded by the crew delivering the supplies. The fresh car of supplies (posts, crossbars and wedges) is coupled to the timbering machine and any unused supplies on the old car are sent outside and remain on the car when it is reloaded. This results in better housekeeping over the entire territory as there is no excuse for loose timbering supplies being scattered over the section.

At Isabella, all of the timbering is done according to plan. Fig. 2 shows the timbering standards for a 12-ft. entry in solid work, roof conditions being normal. A 6x6-in. by 12-ft.-long crossbar is placed on two 6-in. round posts and these timber sets are spaced at intervals not to exceed 8 ft. This means installing a minimum of one set of timbers per cut. The last timber in the heading must be within 10 ft. of the face. All wedges are placed between the top of the crossbar and the roof and are driven toward the face. Lagging or cribbing is placed over the timbers wherever necessary.

For timbering a 60-deg. right-hand intersection (Fig. 3), three different lengths of crossbars are used: 12, 14 and 16 ft. The posting is tied in with the center point and with the position of the frog. These requirements are rigidly observed. Each assistant foreman (section boss) carries a personal Lefex-size notebook with all the instructions and diagrams in blueprint form, not only for timbering, but all other operations.

To better understand the timbering plan used in the pillar work (Fig. 4), it should be noted that the mining plan in use at Isabella consists of a block, or panel, of coal pierced through the middle by a set of entries, with rooms turned right and left as the entries approach the far end to permit a simultaneous start in all pillar places. Enough solid places are provided in the development of a panel to permit full tonnage from the mining equipment. The same crew then brings back the pillars, starting them all at once and finishing them all at the same time.

The pillar blocks are on 115x86-ft. centers and provide four 21-ft. lifts of 10 cuts each. Each lift actually is driven on a nominal 18-ft. width, leaving a 3-ft. fender to keep the gob from sliding in. About every third cut, the fender is cut through. The pillars are pulled on a flat line at right angles to the entry development. The two or three blocks along the old gob are pulled in advance of the panel pillar line at such an angle as to minimize pressure on these blocks from the old gob. Additional development places are driven in the solid behind the pillar line as needed to keep progress with the rib work.

While the illustrations show post and crossbar construction in the mining territories, all crossbars and rail bars on the main line are rib supported. The rib hitches are drilled with a power auger. Then short lengths of rails are inserted and are either cemented or wedged in place, depending on life of the entry. Rib stringers are placed on the projecting pins and then crossbars are installed to span the entry from rib to rib.

LOWER HAULAGE COST
Provided by New High-Speed Locomotives

Reflecting the Need for Greater Capacity and Lower Maintenance Growing out of Higher Wage Rates and Multiple-Shift Operation, New Haulage Locomotives Offer Higher Speeds for Longer Periods

By G. H. SHAPTER
Transportation Division
General Electric Co.
Erie, Pa.

DESIGN OF equipment for any industry must necessarily take into account not only technical ability to do the job but also the general industry situation, including the need for more continuous performance and lower operating and maintenance costs. Equipment for the coal-mining industry, including main-haulage equipment, is no exception.

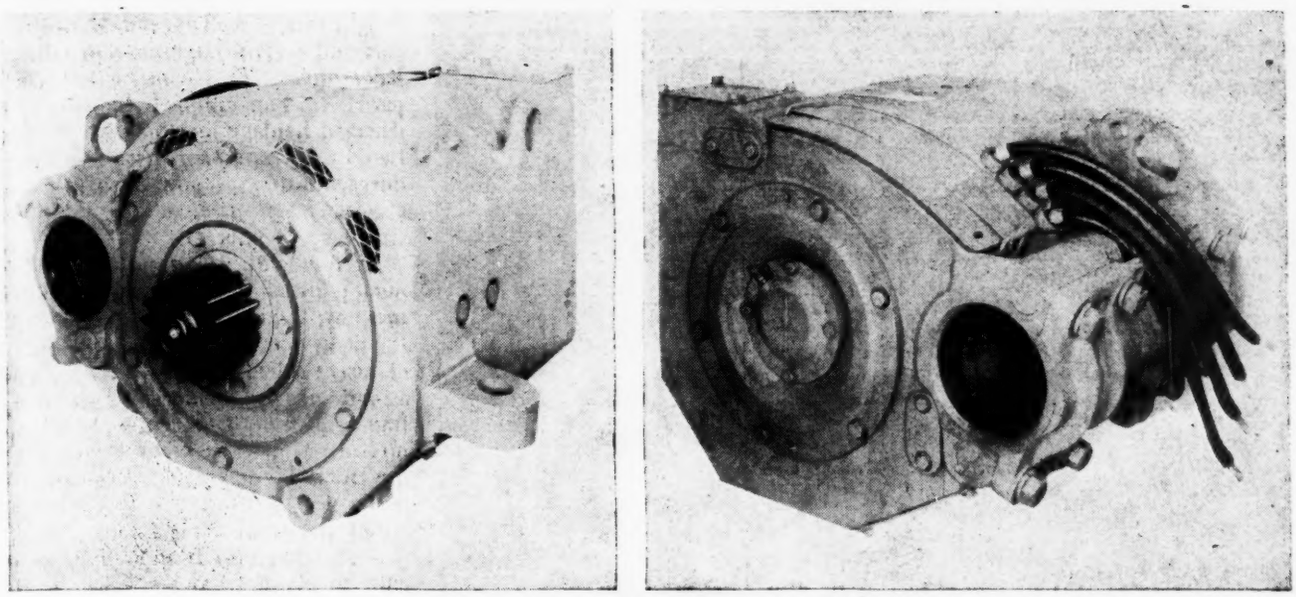
One outstanding element in the coal-mining picture is increasing wage rates. Consequently, to maintain competitive ability, equipment must be able, within the physical limitations prevailing in mining, to produce more in a given time. Thus, in the case of haulage equipment, as well as others, it is possible to secure the same output with a decreased wage cost or, on the other hand, to haul increasing distances—the case in many, many mines—with no increase in haulage units and wage cost.

Where the daily production is large—the situation at many mines—the higher capacity of modern equipment and, consequently, the opportunity it offers of reducing the number of units also makes it possible to reduce or eliminate congestion on main lines. The scheduling problem is eased, the risk of collisions and other accidents is reduced, delays due to the necessity of passing are cut or eliminated, and extra trackage is reduced in extent or rendered unnecessary.

The fact that coal mining today is a two- or three-shift operation is another factor influencing the design of modern equipment for haulage and other mining operations. If damaging delays due to electrical or mechanical breakdowns are to be eliminated, modern equipment must have additional stamina built into it to insure the same reliability in 24-hour operation as was provided by earlier equipment subjected to only 8- or 10-hour use. Because of the need for continuous performance, as well as the higher wage and material costs encountered in maintenance and repair, low maintenance is a must in design for mining service today.

All these and other considerations have resulted in the development of new types of locomotives more heavily motored for higher speeds, equipped

This 25-ton 480-hp. four-motored double-truck haulage locomotive, an example of modern high-speed high-capacity units, can haul a loaded trip of 800 tons gross weight, exclusive of the locomotive, at 11½ m.p.h. on level tangent and return empties at 16½ m.p.h.

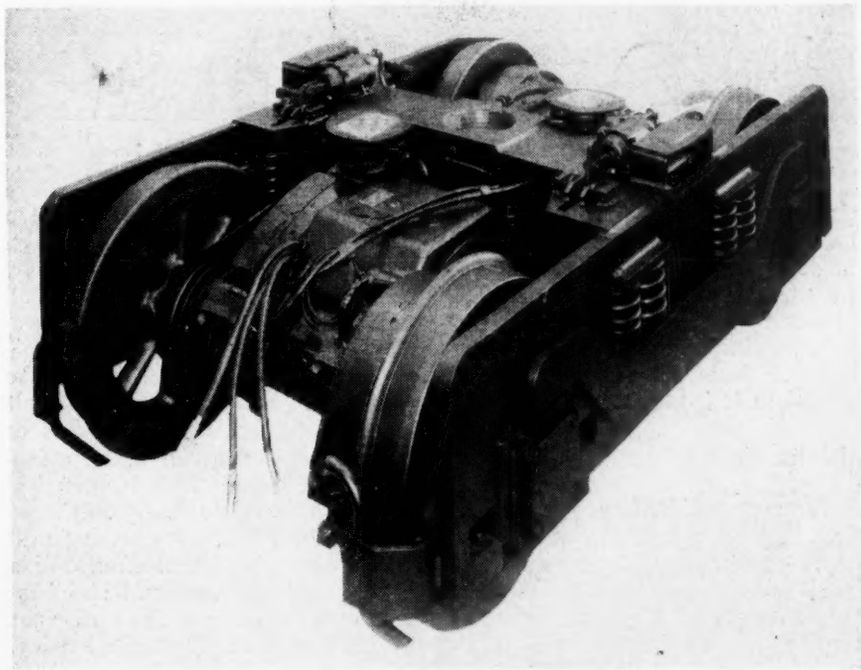


Box-frame ventilated motor for haulage locomotives—drive end at left; commutator end at right.

with new types of controls for ease and safety in operation and designed for continuous use and low maintenance. An example of these new type high-speed units, especially designed for heavy-duty mine haulage (underground or outside), is a 25-ton 480-hp. locomotive for distances of five miles or more, featuring a full-load speed 50 percent higher than the older conventional types.

Ability to increase capacity by raising speed rather than weight reflects advances not only in motors and controls but in truck, frame and suspension designs which provide even greater roadability with the average mine-track construction. In the past, because of these and other considerations, conventional full-load speeds have been approximately 7 to 8 m.p.h. The rated full-load speed of this new locomotive is approximately 11.5 m.p.h., at which speed it can haul, on a level roadbed, a trip grossing 800 tons, assuming anti-friction mine-car bearings and average conditions otherwise. Because of the capacity built into its equipment, the locomotive could operate at this rate without stop or interruption for an indefinite period, if it was possible to keep a mine locomotive loaded to rated capacity continuously. If it were, it would mean a performance of approximately 10,000 ton-miles per hour.

Obviously no haulage locomotive is required to operate continuously at full load, as empties must be handled half the time. Therefore, the heating of the motors on this new locomotive can never reach the value for which they were designed. This insures maximum service before rewinding or other expensive repairs become necessary.

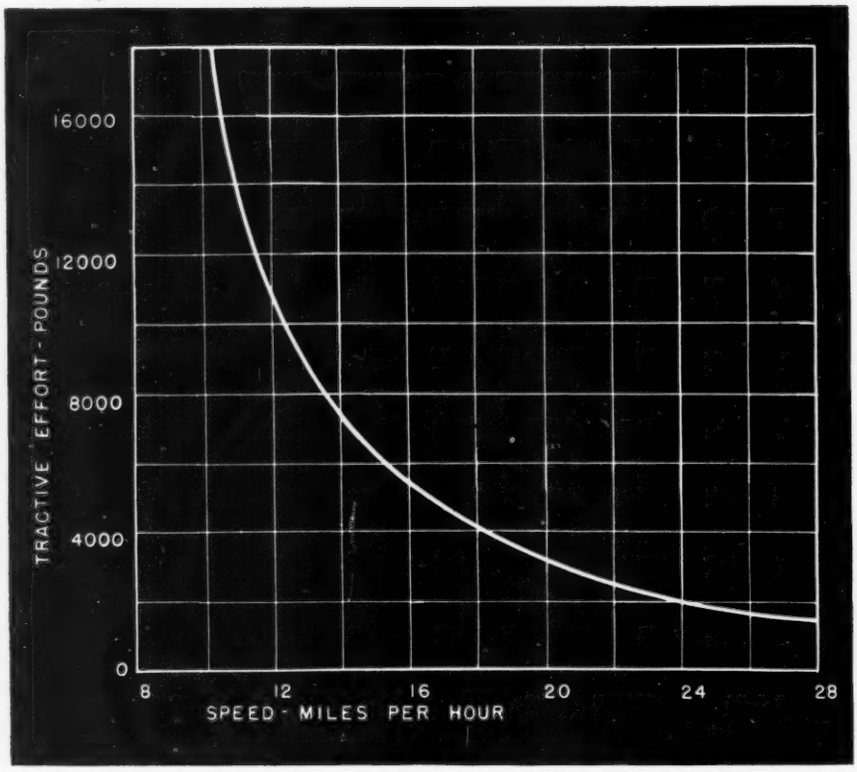


Truck for 25-ton high-speed double-truck haulage locomotive.

As indicated, the increased performance of this new example of modern locomotive design is a function of speed and freedom from trouble. Tractive effort is no different, being a function of locomotive weight and commonly considered as 25 percent of that weight. Consequently, the rated tractive effort of this 25-ton locomotive is 12,500 lb. and is the same as any other mine locomotive of equal weight.

To attain the increase of approximately 50 percent in speed, the horsepower of the locomotive has been raised in proportion. It is equipped with four 120-hp. single-reduction axle-mounted motors, making a total of 480 hp., one hour rating, which, in mining terms, is 19 hp. per ton of locomotive weight. This by itself is a long step toward fitting the locomotive for handling heavy loads over long distances. But to further assure high capacity and continuous operation with heavy loads, the motors are ventilated by individual motor-driven blowers to a point where the continuous haulage capacity is equivalent to 400 hp. with 12,500 lb. of tractive effort. The effect of heavier motoring, ventilation and other design features is to make the locomotive one of the most powerful in its field today.

Because of motor capacity and design, the top speed of this new locomotive is 40 m.p.h.—far in excess of that necessary or probable at the present



Speed-tractive effort curve for 480-hp. 25-ton four-motored double-truck locomotive.

time underground. Design factors making this speed possible include single-reduction motors with normal armature speeds of approximately 500 r.p.m. This, in turn, reflects banding incorporating the latest improved construction developed from many years of work in design of motors for mining.

Motor Frame Cuts Maintenance

The motors differ from general practice of the immediate past in that box-frame construction, rather than the usual split-frame, is employed. The outstanding advantage to the mine operator is materially reduced maintenance. The bearing head is firmly bolted to the magnet frame, thus preventing turning or loosening through wear. The motors are mounted directly on the axles with plain bronze sealed grease linings or anti-friction roller bearings optional. Full-load armature speed is 540 r.p.m., the gear reduction is 72:16 and the normal mounting is on 31-in. wheels. To promote trouble-free operation, all windings are provided with heatproof insulation. Four interpole fields are provided for excellent commutation up to more than 100 percent overload.

For smoother, easier and safer operation, the control is of the electro-pneumatic contactor type with four-motor air-operated reverser. Since slow speed points are not so essential when high-speed operation is desired, motors are connected parallel only with ten points parallel on the controller. Ten acceleration points make the increments of speed change relatively small and thus results in smoother acceleration.

The conventional mechanical brake system, which is increasingly difficult to justify on haulage locomotives of any size, and perhaps on other locomotives as well, manifestly is even less suitable in the case of heavy-duty high-speed units. For smooth braking with a minimum of physical effort and a maximum of safety, powerful air brakes have been included in the equipment of the new unit. Dynamic braking, already shown by experience to have major advantages where heavy or relatively long grades prevail, necessitating more or less continuous application of braking effort, is available when conditions make it desirable.

When locomotive weight and size increase, and particularly where speeds also go up, mechanical design becomes a more critical factor in smooth, low-maintenance operation. Heretofore, with some exceptions, the general use of single-truck two- and three-axle locomotives, when combined with ill-advised dimensions, has resulted in loping and decreased roadability in spite of elaborate equalization schemes. In this example of modern high-speed equipment four-wheeled two-axle swiveling trucks are employed, similar to those on railroad passenger and freight cars, as well as on modern street cars and certain large modern railroad locomotives. This construction, compared to conventional four- or six-wheeled haulage locomotives, provides two to four more driving points, reduces motor horsepower per axle and also decreases axle, wheel and other sizes and weights.

In line with the trend toward reducing or eliminating cast or bolted sections, thereby cutting maintenance, the main body, or frame, is constructed of heavy rolled-steel plate shaped and assembled by welding. This main frame rests on two center-plate bearings—one on each of the two swiveling trucks. The result is a locomotive better designed to ride over the roughest of tracks with maximum smoothness and freedom from loping, along with substantially reduced liability to derailment.

End frames are smoothly rounded and are provided with swiveling couplings mounted on radial drawbar arms. The latter are provided to permit easy coupling despite the long overhang of the double-truck unit. It also reduces the tendency to lift the cars on curves.

Frame Design Increases Safety

For increased safety the end frames are not cut down either in the front or the rear, as has been the general practice heretofore. Since experience has shown that numerous fatal accidents could have been avoided if motormen had not tried to jump, end frames purposely have been left full height to keep the motorman inside the locomotive when an emergency occurs. Thus he is much less likely to be injured or killed. Another advantage is that cars cannot climb into the operating compartment in case of derailment and the motorman is better protected from rails, timbers and the like either when hauling supplies or when he encounters a fall or other trouble along the road.

Putting power, speed and high haulage capacity into a single locomotive naturally is governed by height and other limitations. On the scale discussed in this article it means that clearance must permit an over-all height of up to 48 in. or so. In the case of the new locomotive used to illustrate points made in this discussion, clearance for an over-all height of 45 in. is required, since the main consideration was maximum coal-hauling capacity. But even where height limitations are more severe, design improvements are making possible locomotives offering the user real bargains in higher capacity, safer operation and lower maintenance.

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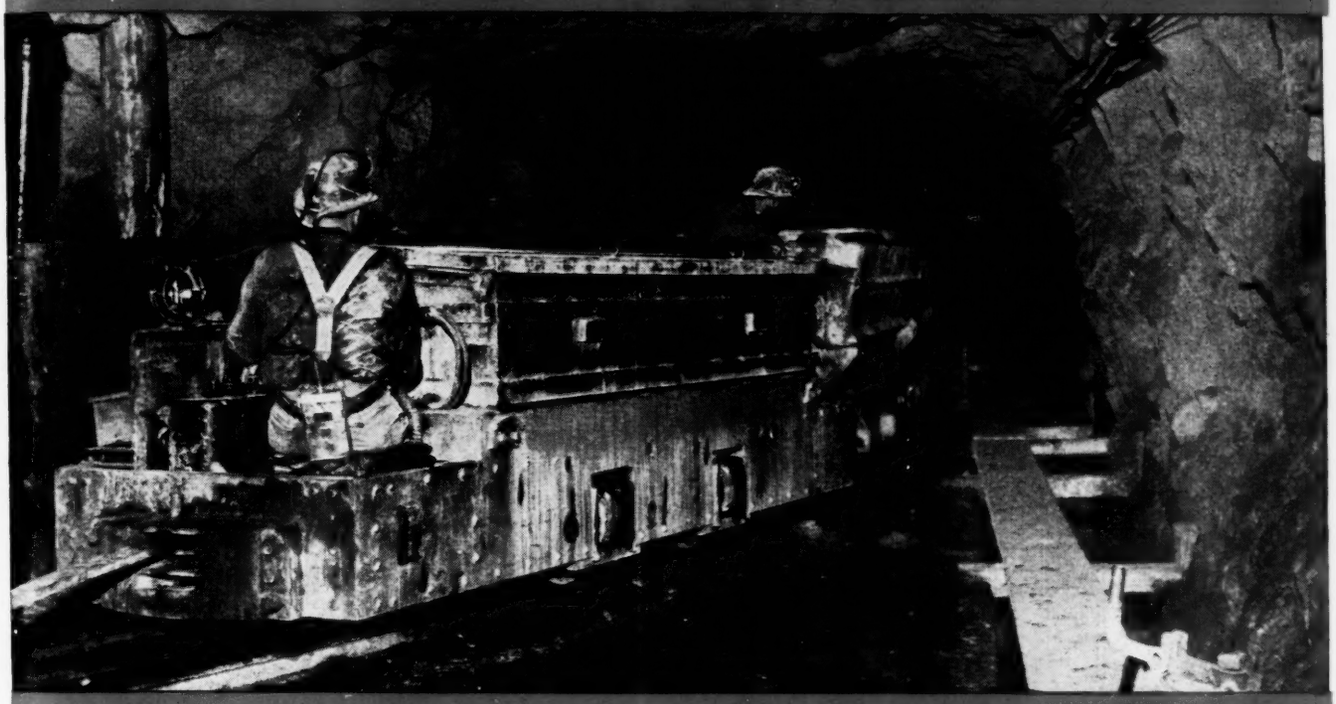

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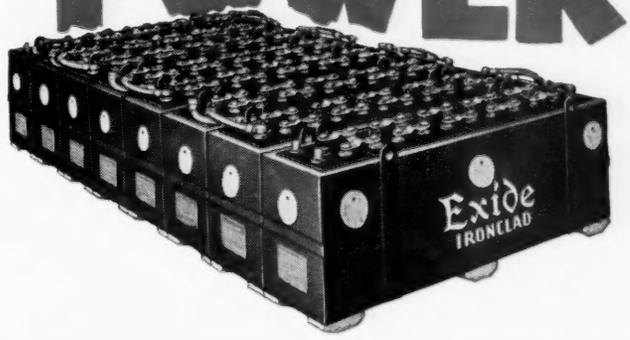

★ **MINE OPERATORS:** If you have not read the U. S. Bureau of Mines circular I. C. 7328, be sure to get a copy from the Bureau of Mines, Washington, D. C.

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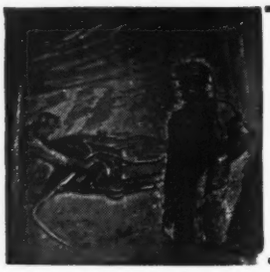

The Foremen's Forum

How Atmospheric Pressure Affects Safety of Entombed Men

Where, After Explosions, Men Should and Should Not Hide—Why Doors Should Be Provided to Divert and Suppress Air

In an earlier article in this department (January, 1947, p. 84), it was stated that if the pressure of the atmosphere exterior to the mine increases, air will be pushed into the workings. This air pushes on the air ahead of it, and so long as there is no opportunity for it to push that air sidewise into old rooms, excavated or unexcavated, all the air will move along the headings, communicating its pressure to the air ahead of it until it comes to places where such lateral movement is possible.

It will then communicate that pressure, unreduced, not only to the points ahead of it but to points beside it and behind it, until all the air in connecting spaces becomes of equal pressure to that of exterior air, and until all the air reached by this devious movement has shrunk under that pressure to the same degree as the entering air.

Small Windpipe, Big Lungs

Large Volume Shrinks, Air in Heading Moves Accordingly—The volume of air entering will be enormous. The volume of air that will move along the headings will be equal to the shrinkage per cubic foot multiplied by the entire volume of the air that so shrinks. The air, thus, is able to travel in the headings as many times further forward as the volume of the area bears to the area occupied by the headings and their connecting crosscuts.

At the risk of some repetition, this will be somewhat inadequately illustrated by Figs. 1 and 2 where, however, there are only two openings beyond the heading and none behind it. The reader should be able to imagine what would happen if a larger volume of workings than shown were present. One would not wish to show all the extensive workings of a large mine.

The Narrower, the Further

Why Air Travels Further in Heading Than in Goaf—Perhaps it should be explained in more detail why the air travels in headings fast and far. In Fig. 3, p. 112 area *ABDC* is a plan of an inclosure measuring 100x200 ft. in its horizontal dimensions and 6 ft. high. The volume of the inclosure will be 120,000 cu.ft. This air in *ABDC* is assumed in some way to be so compressed that it shrinks one-thirtieth of its original volume. That is, it loses 4,000 cu.ft. of volume and occupies now only 116,000 cu.ft. Suppose this is effected by pushing the air of which *EFDC* is the plan into the area of which *ABFE* is the plan. How this can be done is not the point but, for the argument that follows, we will assume it is done. *EFDC* will represent the shrinkage and *EC* and *FD* will represent the movement of the air. You can calculate it, and you will find that, with a shrinkage of one-thirtieth, it is $6\frac{2}{3}$ ft.

In Fig. 4, the same dimensions and shrinkages are assumed, but passageway, 10 ft. wide and 6 ft. high is sketched leading to the area *ABDC*, and the air enters the nearer end of that 100x200-ft. area. It supplies the air to fill up the shrinkage. As that shrinkage is 4,000 cu.ft. and as the cross sectional area is 60 sq.ft., the column of air that will pass in will be $4{,}000 \div 60 = 66\frac{2}{3}$ ft.; so the air passing from the heading must have occupied $66\frac{2}{3}$ ft., before the increased baric pressure was experienced.

Ten Feet of Advance to One

Air in a Narrow Place Travels Far—Thus, you will note that whereas in Fig. 3 the air moves forward only $6\frac{2}{3}$ ft.; in Fig. 4 the air in the passageway moves forward $66\frac{2}{3}$ ft. from *GH* to *CD*, which is reasonable because the width of the enclosed area is ten times that of the width of the passageway. That illustrates how the width of the approach-way or ways to the wide open spaces at the working face or elsewhere determines the traveling speed and the travel of the air in the approach. Unfortunately, for lack of space in this page, the illustration could include only a small enclosure; if the open or loosely caved area of a big mine that has been running for years could have been illustrated, it would be possible to show an advance in the room headings greater even than the length of the roadway between that point and the mine portal and that even where there are two headings provided for this lengthy approach.

Receives Air From Surface—The mine would be receiving air pushed in from the outside, and that air probably will be fresh, but that will not help at all, if slugs of carbon monoxide lie in the headings between the outside of the mine and the miner's hideaway. We shall later term that $66\frac{2}{3}$ ft., the "foreshore," but it is only the foreshore for that single inclosure and not for the wide area of which it may be a part. That is a very important distinction. You will note that, if there is carbon monoxide at *GH*, a person anywhere in the area *ABDC* will be safe from carbon-

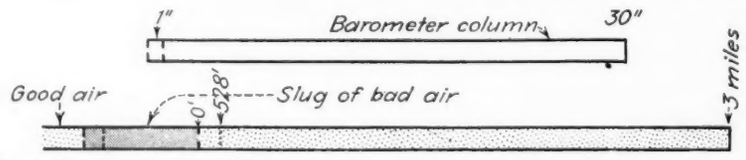

Fig. 1—Barometer column drops 1 in 30 with an inch fall in pressure, so bad air travels in a tunnel 1 in 30 under same conditions, or 528 ft. in three miles

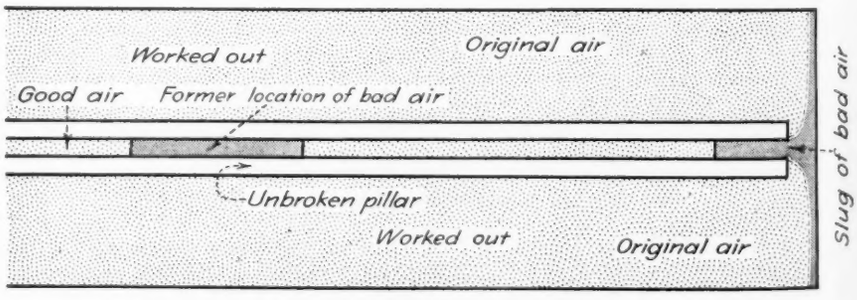

Fig. 2—Here the tunnel opens into old workings at its extreme end and, because of the big shrinkage in these workings, the bad air moves up to face of the tunnel and to face of the old workings, followed by good air which stays in tunnel.

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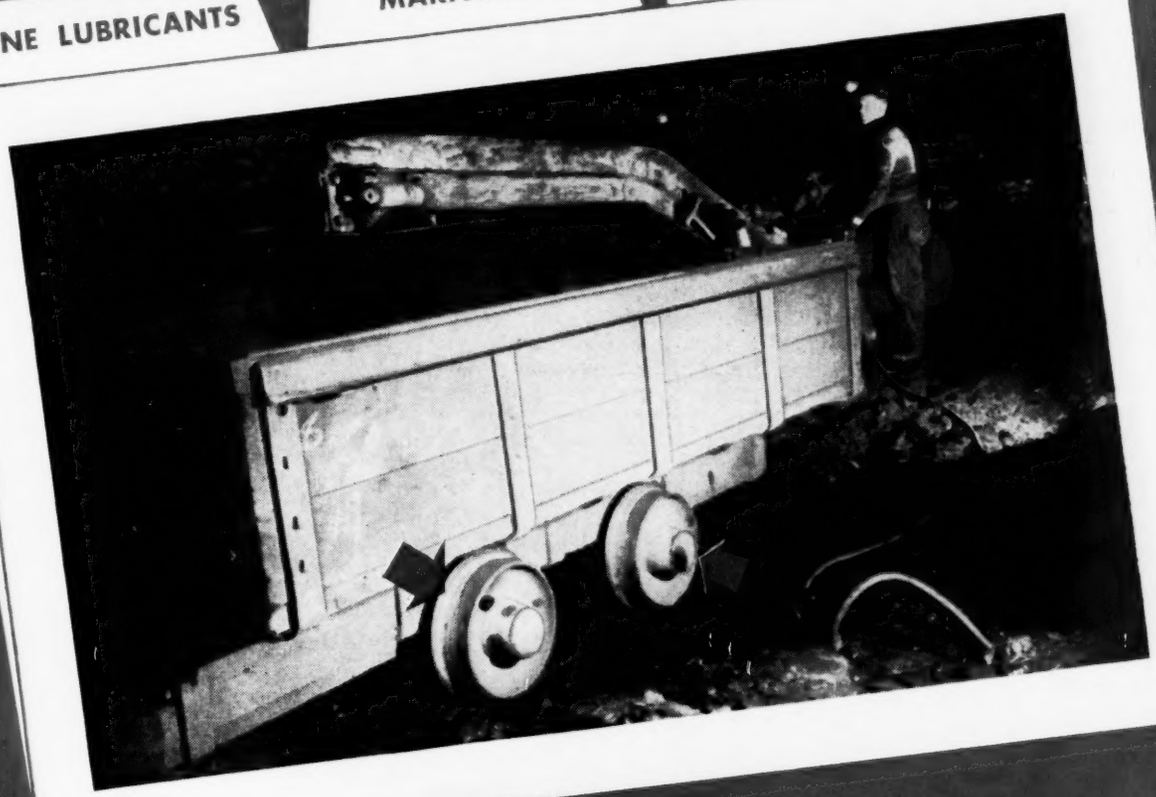

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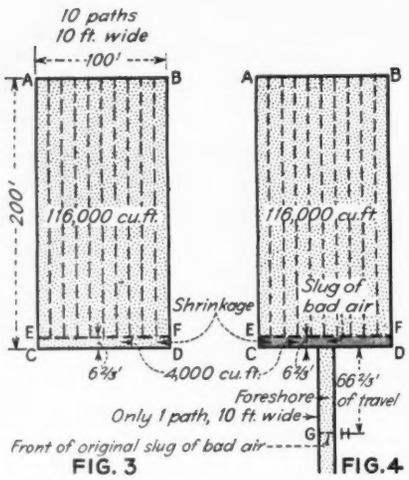


Figs. 3 and 4—Ratio of face width to heading width determines length and speed of travel in the heading, just so far as the heading is the sole means of approach. Thus, the length of movement in a heading leading to a goaf or gob will be much greater than in those extracted areas which are wide.

monoxide poisoning by direct air movement, but at CD diffused carbon monoxide will probably take his life if he stays long at that point, but he has plenty of room in the rear in which he, for some time, can seek safety.

Supported in Mid-Air

How to Lie Down—In lying down, you preferably should lie on a safely supported plank that is a foot or so above the floor at the plank's upper end and preferably sunk in the floor so as to prevent the plank from sliding. This will keep your head more safely above possible accumulations of carbon dioxide. It will be less difficult for you to keep below the methane, for that will hug the roof. However, you should try to have posts alongside you to prevent you from rolling off the plank, or you will fall into the carbon dioxide below you and then may suffocate. When you are overcome by too high a percentage of carbon monoxide or carbon dioxide or too low a percentage of oxygen, you are likely to doze and fall off the plank into the strong percentage of carbon dioxide below you. Don't talk too much for when you talk you breathe more heavily and draw in too much carbon monoxide, if any manages to reach your hideaway.

Baleful Effect of Bleeding

Rooms in Headings Should Have Dead Ends—It should be remembered that rooms to be used as a hideaway should not be chosen if they have bleeders into other headings or have other connections thereto, because the air then will be able to push air into these headings and into connecting headings and rooms with lower air pressure, if such there be. The movement in any room chosen as a hideaway will be almost as great in that room if there is no bleeder from it to the heading beyond it, provided that bleeders from other rooms afford a communication through room crosscuts or the goaf or both to that heading.

Connections to Explosion Area Fatal—Especially will conditions render that hideaway an abode of death, if such bleeders or communicating passages lead toward or reach into headings or workings where the explosion has reached, and where local fires ignited by the explosion have occurred thereafter, because the air ahead then will be at a low pressure due to its shrinkage resulting from the cooling of the air in the explosion area from the high temperatures existing during the explosion and, after the explosion, from the slower combustion that for a while has resulted. The high pressure of the outside air will be assisted in traveling through the hideaway rooms by the low pressure of such cooling areas, and the two actions, being supplementary, will result in creating a most serious situation.

If, however, the combustion should increase and thus heat the air, in the area formerly ravaged by the explosion, the direction of movement may be reversed, and the foul atmosphere of the explosion area will itself invade the hideaway and render it foul and lethal.

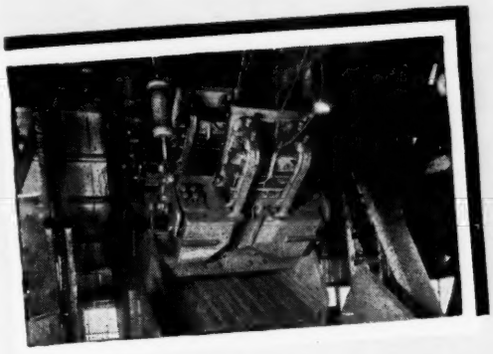
Doors Afford Safety—It is well to have doors available in both intakes and returns for shutting off parts of the mine. They serve when closed, (1) to destroy circulation and (2) to make the bad air resulting from the explosion (as sent in by the rise in baric pressure) leave the heading in which it is already advancing and pass into the immensely wide caved areas. Thereafter, instead of being crowded in a narrow heading or headings it will have so many ways of moving toward the working face, that, though it will be pushed ahead as before, it will not be advanced so near to the working face as it would be if diverted further on to such wide channels. The bad air pushed into the mine by increased baric pressure will then get no more than an average of one-thirtieth of the remaining distance to that face and, as stated, so short a movement is not likely to do much harm. In a heading, unprotected by closed doors, the movement will be dangerously extensive, but, if it enters into a very wide excavated area, it will not travel far, only an average of one-thirtieth of the distance.

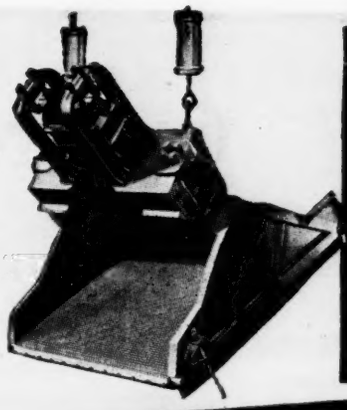
This Air Has Tides Like the Sea—This movement is like a tide in the ocean, which carries the water just so far and no further. On the edge of the ocean, it is stopped by the shore. In the mine, we are dealing with air, not water, but, in a similar manner, the air tide surges forward under baric pressure, and it compresses the mine air so much that the pressure it imposes on the imprisoned air holds it back. Like a tide, it travels fastest through narrow passageways as the water would travel through the Panama Canal, if there were no locks, whenever the tide in the Pacific Ocean was higher than in the Atlantic Ocean, or vice versa. Almost nothing can stop the air but its own back pressure, but if it can be diverted into wider passages, it will travel more slowly and less far, as it has width-room to afford the necessary air volume to fill the air-evacuated space, and so does not demand much traveling distance.

As the air moves a definite distance toward its rear line—the working face—the distance that the air moves up may be termed the "foreshore" for any given change in baric pressure, and this advice may be given: "Always keep a safe foreshore and a little more between you and polluted air, or you will be flooded with it, if the air pressure rises. Don't lie down in the water foreshore at low tide, for at high tide, the billows will roll over you. So don't lie down in the air foreshore at low barometric pressure for, at high barometric pressure, the sea of bad air from the explosion will overwhelm you."

If the baric pressure is very high, when the explosion occurs, that is, if the barometer is high at that appalling moment, there can be no higher pressure later, and so no advance of bad air due to increase of baric pressure, and those at the face then will be endangered only by methane and carbon dioxide and by diffusion of carbon monoxide. Thus, the chances of escape will be immensely increased, provided true ventilation is completely suppressed. The slugs of carbon monoxide will remain where the advance leaves them, for they will not be pushed further forward, and they will have a longer distance to advance by diffusion. However, the mine workers will not know how high the baric pressure was when the explosion occurred, so they will do well to keep *near*, but not *at*, the working face, and to act as if the worst conditions confronted them, remaining near the face until a rescue party enables them to leave.

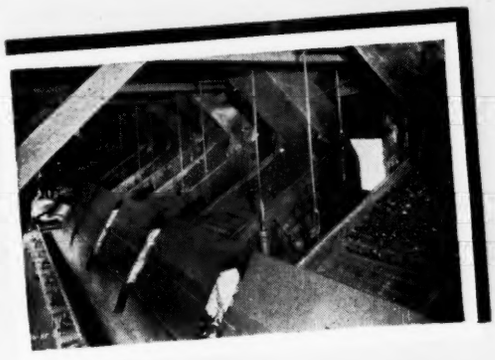
Fig. 5—When you lie down in a safety zone lie on a plank secured against movement and guard yourself against rolling off the plank by props. Keep away from rib.

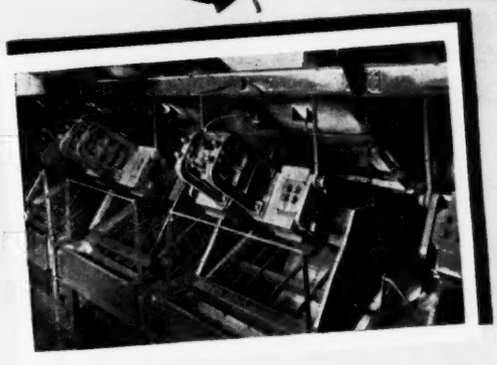




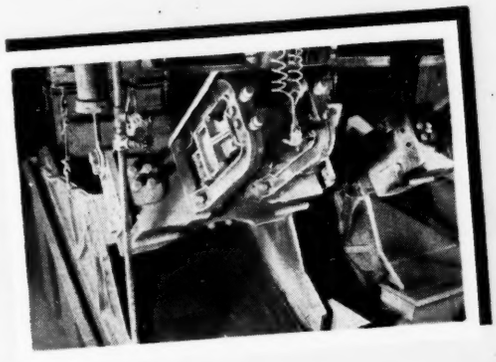
JEFFREY TRAYLOR *Electric Vibrating* SCREENS

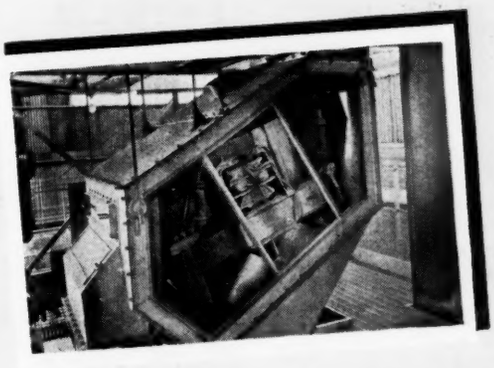
(Patented)

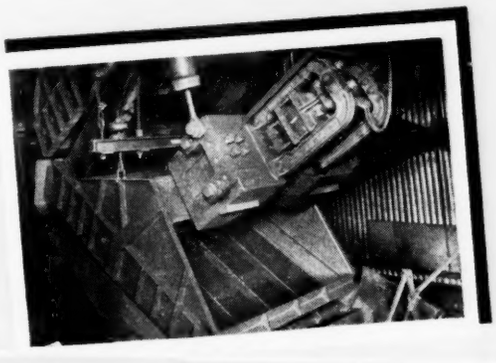




SIZING
SCALPING
BY-PASSING
WASHING
RESCREENING
or
DEDUSTING







A Few Typical Installations

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Complete Line of Material Handling, Processing and Mining Equipment

Operating Ideas

Batteries Kept Charged in Storeroom

NEW 12-VOLT STORAGE BATTERIES are given a trickle charge to keep them fully charged right up to the time they are installed in the trucks, states Edward Wilson, storekeeper, Little Sister mine, Little Sister Coal Corp., St. David, Fulton County, Ill.

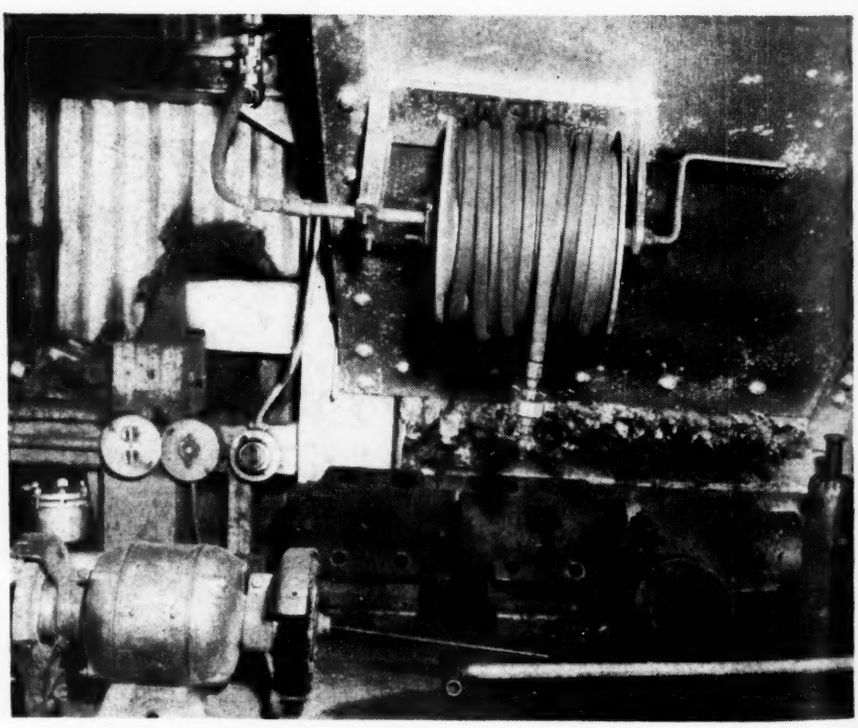
The charging stand, shown in the accompanying illustration, includes a rectifier for obtaining the d.c. current from the 120-volt a.c. supply. A fraction of an ampere trickle charge keeps the batteries "factory fresh"—ready for immediate use at their guaranteed ratings. Keeping the batteries fully charged while they are on the shelf means that they are kept in a healthy state.

Charger keeps 12-volt batteries "factory fresh" while on the storeroom shelf by means of "trickle charging."

Hose for Blowing Handier on a Reel

HAVING an air-connected reel for the hose used for air-jet cleaning in a maintenance shop saves time and space and is neater and safer. It reduces re-coiling time and there is a further saving of time by making it unnecessary to move equipment closer to the supply connection. With a reel, a longer hose can be used without inconvenience. The method is safer because a hose left kinked along the floor can trip a man.

The reel illustrated is in the maintenance room in the central preparation plant of Red Ember mine of the Truax-Traer Coal Co., Fiatt, Ill. It is hung on the bottom of a sloping steel chute above the work bench. The packing gland making the rotary joint of the axle airtight can be seen at the left of the reel. Above and farther to the left is a globe valve used to cut the air off the reel when no one is working in the shop, thus avoiding leaks. The reel is rewound by hand using the crank at the right. The usual type nozzle is used on the end of the hose.



The reel is mounted on the sloping underside of a chute above the work bench. The hose is long enough to reach any point in the room. Air is conducted to it through a packed joint in the axle.

INDUSTRY-WIDE BARGAINING...

Death Trap for Business, Suicide for Free Labor

IF CONGRESS is to succeed in its present efforts to prevent strikes in key industries from devastating the nation, it will have to put a crimp in industry-wide collective bargaining. This kind of bargaining is designed to apply agreements between employers and organized workers on wages and working conditions to an entire industry.

Further, if extension of this type of bargaining is not curbed, there is reason to believe that it will undermine the freedom of both American business enterprise and American wage earners. For, while increasing the destructive power of labor disputes, the general spread of industry-wide bargaining would so concentrate the fixing of wages—by far the largest element in the cost of production—that government regulation would be a next short step. With that step taken, freedom for business enterprise and freedom for labor would be well on the way out.

Unfortunately, industry-wide bargaining is commonly regarded as presenting a general conflict between organized labor and employers, with unions favoring it and employers opposed to it. This mistaken notion raises the heat of much of the discussion without increasing the light. The fact is there is no such general conflict. Employers and organized workers are on both sides of the argument about industry-wide collective bargaining. For example, while some union leaders are characterizing as labor baiters all those who raise the slightest question as to the desirability of industry-wide bargaining, organized workers in the air transport industry are strenuously opposing that type of bargaining; and the employers are advocating it.

Some Employers Like It

The reason there is in fact no clear cut issue between employers and unions over industry-wide bargaining is readily understandable. It presents certain advantages to both sides in the bargaining process. For example, union advocates of such bargaining generally stress the fact that industry-wide agreement on wages protects wage standards from being undercut by lower wage areas and lower wage employers. By much the same token, however, employers who like it often emphasize the fact that industry-wide bargaining may save certain well-managed and prosperous companies from being singled out for particularly heavy wage exactions. This general point has been underlined in both the full-fashioned hosiery industry and the West Coast paper and pulp industry. There, local unions, affiliated with international unions, have protested that industry-wide collective bargaining prevents them from getting from especially prosperous employers wages as high as they could get if allowed to go it alone in collective bargaining.

So long as employers remain subject to the federal antitrust laws while unions are exempted, the balance of power in industry-wide bargaining would seem to be heavily weighted on the side of the unions. If, for example, employers were to announce an intention to match an industry-wide wage increase by an industry-wide price increase, there is no doubt that they would promptly be indicted for violation of the federal antitrust laws. Even so, the fact remains that some employers favor industry-wide bargaining while some segments of organized labor are against it.

A Clear Cut Public Issue

The industry-wide bargaining issue as it affects the public, however, is clear cut. It is concentration of economic power (in the hands of both unions and management) which can make industrial conflict devastating to the public welfare. At least five times within about a year—in steel, on the railroads, in the maritime industry and twice in the soft coal industry—strikes prompted by union efforts to impose industry-wide agreement about wages and working conditions have paralyzed large parts of the nation's economic life.

In soft coal about 90% of the production workers are members of the United Mine Workers. In steel

about 80% of the production workers are members of the United Steelworkers, C. I. O. In some other key industries there is a comparable degree of concentration of union control. In the face of such concentration many employers see no alternative but to get together on their side for industry-wide bargaining. But when they do so in key industries, the odds are lengthened that failure to agree on wages and related matters, will result in generally ruinous conflict. If agreement is reached, the chances are increased that it will take too little account of the welfare of the consuming public.

It is possible to have industry-wide bargaining on many subjects other than wages. *But the main interest is wages; and the main drive is toward industry-wide and ultimately nation-wide uniformity. Such uniformity is the deadly enemy of industrial decentralization and the pioneering expansion of industry in new areas.* Why pioneer, with inexperienced workers, if the wage rate must be uniform for the whole industry? Moreover, it would also be hard to conceive of a more effective way to put a blight on local efforts to improve industrial relations than to make wage rates and other working conditions uniform throughout the industry and then the nation. *However, among many other dangers, the overshadowing danger in industry-wide bargaining lies in its concentration of economic power.*

Wages Monopolized

On the average, the cost of labor accounts for about two-thirds of the total cost of all industrial products. The universal spread of industry-wide bargaining would thus concentrate in relatively few hands control of the greater part of the cost of industrial production. There is no reason to believe that even without disastrous strikes, such concentration would long continue free from government regulation. That would turn more earth for the graves of American business enterprise and American working men's freedom.

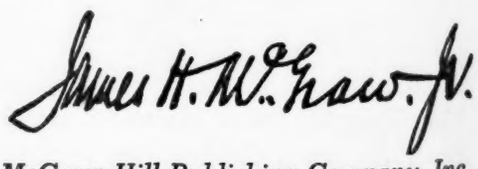
Those who believe that industry-wide bargaining serves the public well—and many sincere people do—stress the fact that, on the whole, it has worked in the industries where it has been tried over a considerable period. Most of the industries of which this is true, however, are not key industries. The pottery industry, the glassware industry, and the silk and rayon dyeing industry—to cite a few in which industry-wide bargaining has been practiced with considerable success—are important industries. But they are not industries in which strikes would have a ruinous impact on the nation. In contrast, a strike in the soft coal industry as the result of a breakdown of industry-wide negotiations quickly becomes a national disaster. The dangers inherent in industry-wide bargaining are multiplied accordingly.

England No Guide

Those who think extension of industry-wide bargaining would be good for the public often emphasize the fact that it has worked smoothly in England, where it has been extensively practiced. *Not the least of the things it has smoothed in England, however, is the transfer from private enterprise to state socialism of industries in which industry-wide bargaining by monopolistic unions and employer groups had so badly undercut competition that private enterprise had lost much of its justification.* A general extension of industry-wide bargaining could be expected to have the same consequences in this country.

The best way to curb industry-wide bargaining is a question which lies beyond this discussion. *Much would be accomplished if the federal government would discontinue its active promotion of industry-wide adjustments, in the fields of both labor and management, at which it has been busy ever since N. R. A. days. Still more would be accomplished if the federal antitrust laws were applied with even-handed justice both to unions and employers—a course urged in the 53rd editorial in this series.* Perhaps a definite limitation of the scope of labor agreements would also be necessary.

The effects of industry-wide bargaining in increasing the extent of public regulation of industry will vary. They will, of course, be less pronounced in railroads and other public utilities, which are already extensively regulated, than they will be elsewhere. For unregulated industries, however, industry-wide bargaining carries the threat of extensive regulation and, along the way, of industrial conflict devastating to the public. In these excited times, to say what I have said here is to invite characterization by overheated partizans as a foe of legitimate union progress. That is perhaps not so bad, however, as to qualify as a pall bearer for both American business enterprise and some of the basic freedoms of American working men. That may well be the fate of those who blindly accept the expansion of industry-wide collective bargaining as being "in tune with the times."



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This Otiscoloy stack is 150 feet high, 10 feet in diameter at the base and 6 feet in diameter at the top. All seams both inside and out are electric welded.

JONES & LAUGHLIN STEEL CORPORATION
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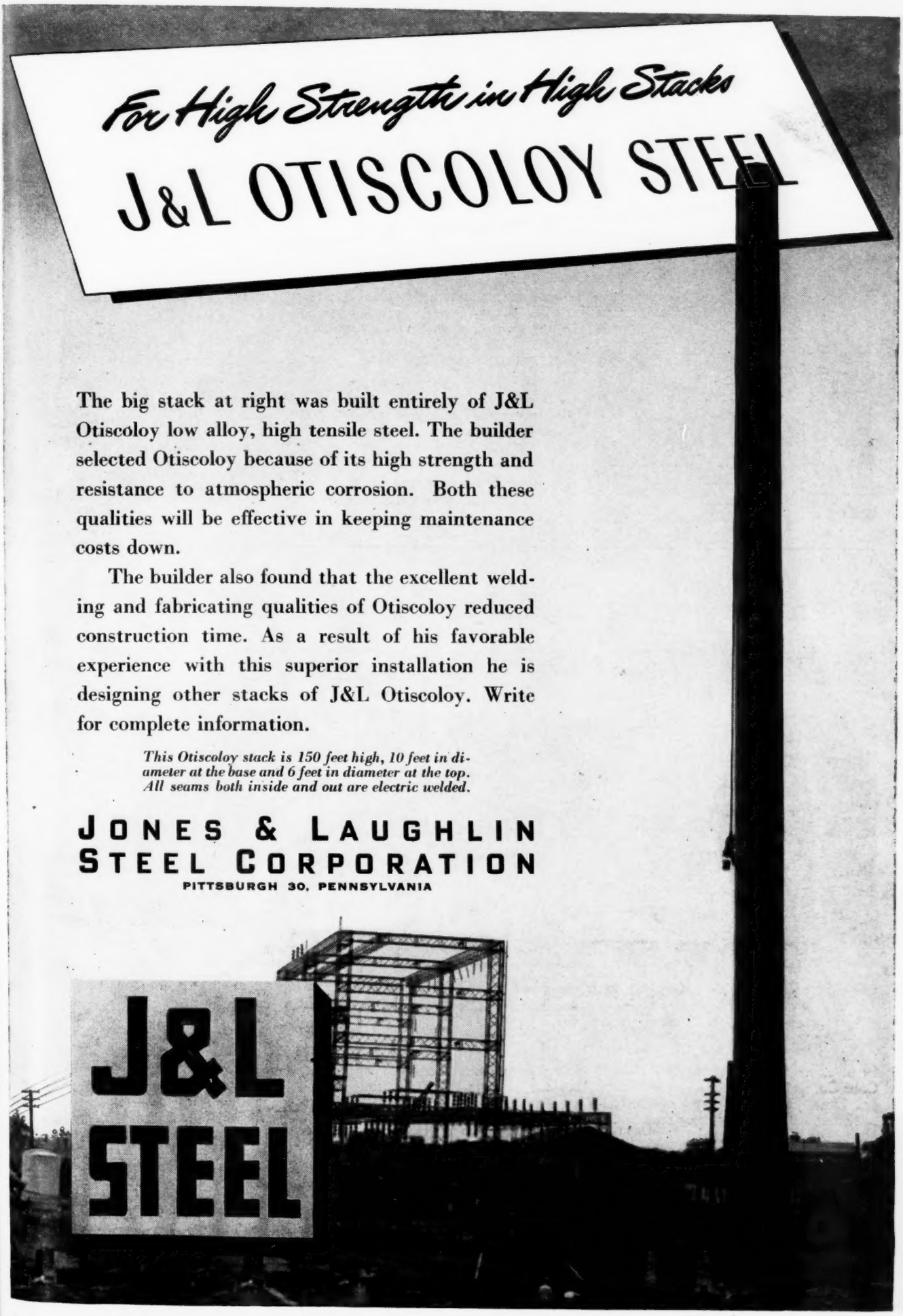
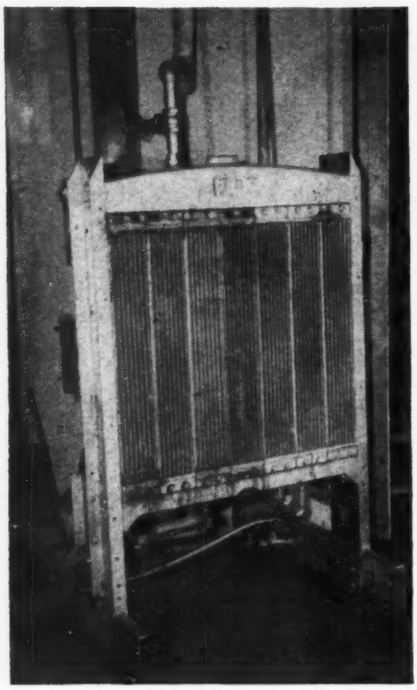


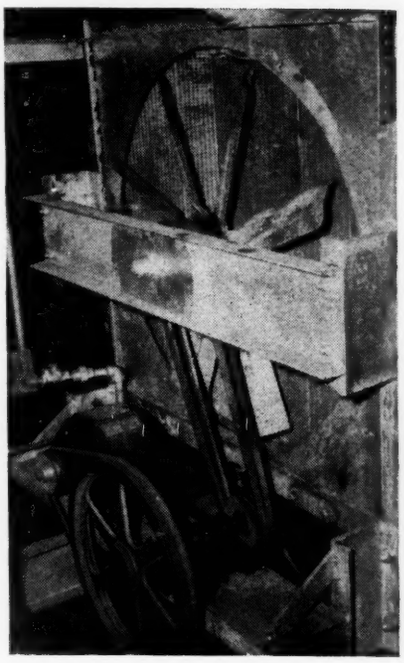
Radiator Converted to Unit Heater



A DISCARDED RADIATOR from an old stripping shovel power plant is doing the job of heating the large storeroom, says Leonard W. West, assistant superintendent, Little Sister mine, Little Sister Coal Corp., St. David, Fulton County, Ill.

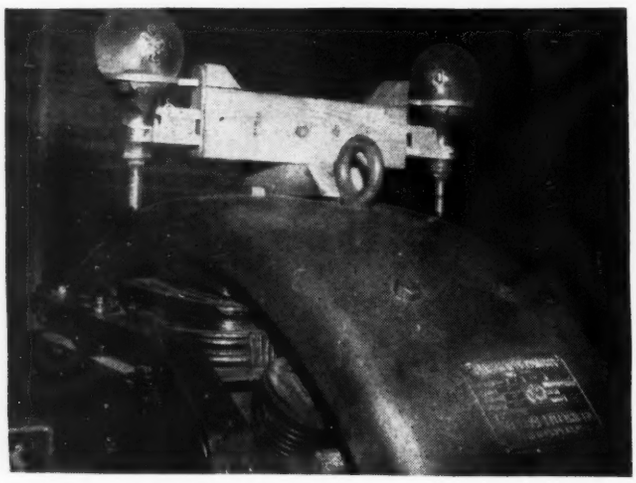
The radiator, shown in the accompanying illustrations, formerly was a water-to-air heat exchanger for an old P & H (Harnischfeger) power unit. Then it was used as a cooling device—trying to get rid of heat. Now it is used as a heater and still is getting rid of heat. But the heat which it extracts heats the storeroom. Air is forced past the radiator coils by a fan driven by a General Electric Tri-Clad motor through a double-reduction V-belt drive. Hot water for the radiator comes from a nearby power plant.

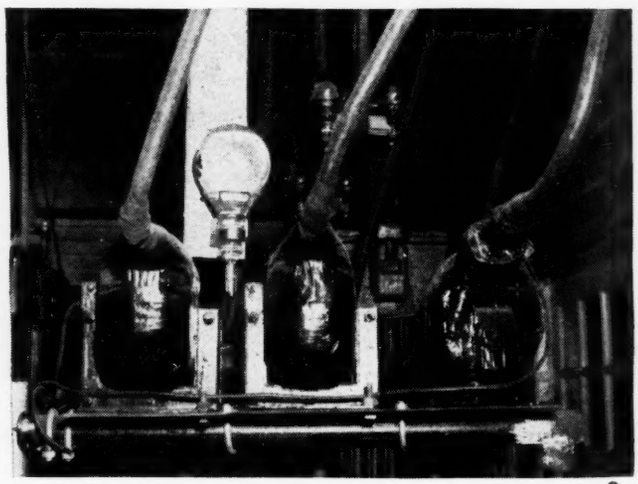
An engine radiator makes unit heater for keeping the storeroom more comfortable.



The motor drives the heater fan through a double-reduction V-belt drive.

Automatic Extinguishers Installed in Substations





Left—soft link extinguishers installed on a converter; right—instrument transformers are protected with one extinguisher and the converter power transformers (background) each have a pair of extinguishers over them

IN D. C. SUBSTATIONS of the Gay Coal & Coke Co. and Gay Mining Co., in Mingo and Logan Counties, West Virginia, converters and several other items of power equipment are protected by automatic carbon tetrachloride extinguishers. At the latter property, they are credited with saving a machine on which the insulation had caught fire.

The illustrations show some of these automatic extinguishers as installed in the outside substation of the Gay Mining Co. The liquid is released when heat breaks the glass container but the actual breaking is done by a spring and hammer released by the fusing of a soft link. These extinguishers are a product of the Auto Fyrstop Co.

The substation consists of two 250-kw. 275-volt converters and each converter is equipped with two extinguishers. At this substation, the three converter transformers are oil filled and are located inside the building. Consequently each has a pair of the extinguishers hung above it. Control equipment back of the switchboard is likewise protected by extinguisher installations.

Because the extinguishing liquid is a non-conductor and is non-corrosive no harm would be done if through an unusual circumstance or accident an extinguisher should discharge when there is no fire. Putting out a fire may save a production loss by avoiding a shutdown and may save damage to a machine or loss of the whole substation. Inasmuch as any fire is a potential danger to life, safety is an added advantage of the automatic protection that in itself pays dividends.

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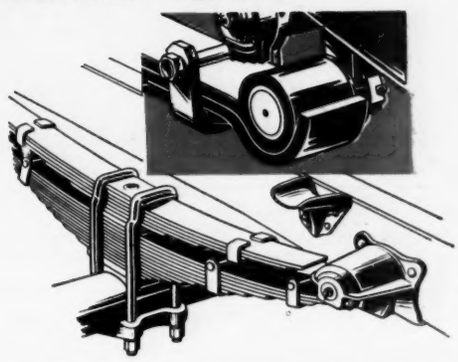

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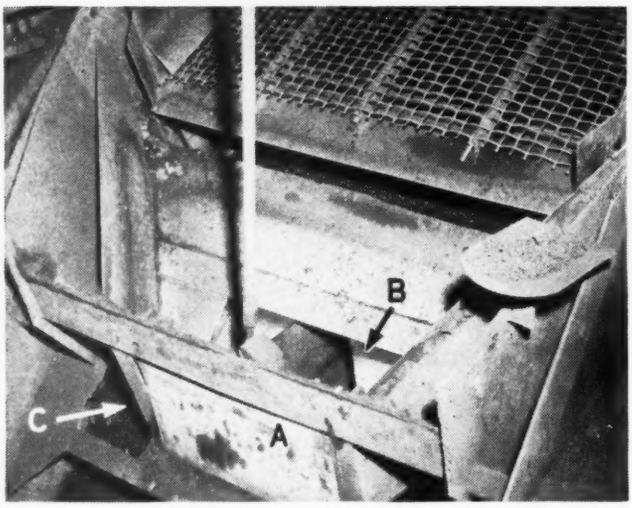
FORD TRUCKS

MORE FORD TRUCKS IN USE TODAY THAN ANY OTHER MAKE

Wings and Fly Gates in Screen Chute Add Flexibility



The flygates are set to drop oversize to crusher and move the undersize, via side passages, to the chute straight ahead.

INSTALLING wings in a chute to bring the large size to the center and provide side passes for the smaller size added considerable flexibility to the flow of coal in the transfer station and run-of-mine tipple at Red Ember strip mine of the Truax-Traer Coal Co., Fiatt, Ill. The new arrangement is at the discharge of a vibrating screen installed ahead of a crusher. As originally installed, the 1¼x6-in. could go only to the crusher, which is below the chute, and the 1¼x0-in. back to a slack car.

It was found desirable at times to send the oversize or the undersize straight ahead along a chute to a car on another track. The illustration shows the revised chute with wings installed and two sets of doors arranged to drop the oversize down to the crusher and allow the undersize to go straight ahead.

To send the oversize straight instead of to the crusher, Flygate "A," which is hinged at the bottom, is dropped down to close Hole "B." To send the undersize back in accordance with the original flow, a side door is raised to open a hole in the pan at "C," at the same time blocking the side passages. A similar door in a passageway along the near side must be manipulated the same way.

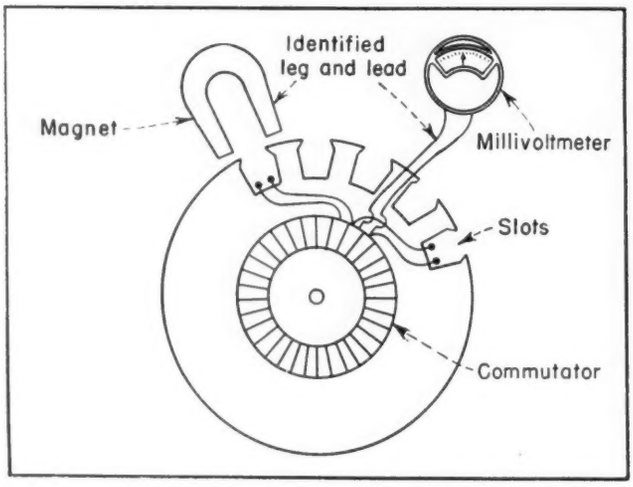
Ties and Poles Prefabricated For Trolley Supports

EXCELLENT ALIGNMENT and low maintenance is assured by the trolley-wire construction on an outside tramroad to a new opening, known as the No. 2 mine, of the Gay Mining Co., Mingo County, West Virginia. On this 48-in. gage track with 60-lb. rails, two 6½-in. by 9-ft. 7-in. ties are used to support the 6x6-in. post. The foot brace likewise is 6x6-in. and its lower end also fits between the ties. The arm is 3x4-in. and its brace is the same size.

Assembly is with bolts; all of the wood is creosote-dipped oak. Parts were prefabricated, drilled and treated with creosote at the shop. On the side of the track opposite the wire the ends of the pair of long ties are spaced permanently by a 6-in. wood block. This construction costs less than steel, which was difficult to get, and its life is calculated to be about that of the mine it serves.

Pole and brace is bolted between a pair of long ties.

New Method Detects Reversed Armature Coils



How magnet and meter are used to find reversed coils.

"ANYONE who has had the misfortune of attempting to install an armature with a reversed coil will testify to the fact that it can be a most aggravating job to determine just what ails it," writes Paul C. Ziemke, Oak Ridge, Tenn. "The accompaning illustration shows a method that will function speedily and effectively to ferret out such trouble-making coils.

"The method requires a good horseshoe magnet and a millivoltmeter or, if one is not at hand, a galvanometer or ohmmeter. First, identify one side of the magnet with a turn of tape and one side of the meter likewise. This insures getting the same side applied at all times during the tests. Next, hold the magnet to a coil slot and then pick up the corresponding pair of commutator bars with the tips of the meter leads. The needle normally will swing regularly in the same direction as the test is made on each armature coil slot in turn. When a reversed coil is encountered, the needle will swing in the opposite direction since the current induced in the coil will have the wrong polarity.

"This method is an improvement over the compass and power-application method used in many shops, since it can be applied in the field where neither compass nor power may be available."

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3. ***TOUGH*** **CUT RESISTING TREAD:** the rubber is compounded to resist cutting, snagging and bruising.
4. ***TOUGH*** **ROUNDED SHOULDERS** minimize snagging and cutting and improve flotation in soft going.
5. ***TOUGH*** **EXCLUSIVE "U. S. SAFETY-BONDED CORD"** construction produces the strongest, longest-lasting tire body possible.
6. ***TOUGH*** **SHOCK PAD CONSTRUCTION:** provides extra protection against ruptures and blowouts.

U.S. ROYAL CON-TRAK-TOR TIRES

SPECIFY *TOUGH* U. S. ROYAL CON-TRAK-TORS FOR LOWER COST PER MILE

UNITED STATES RUBBER COMPANY

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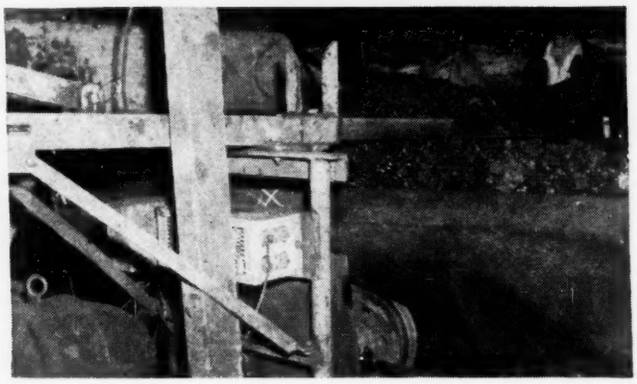
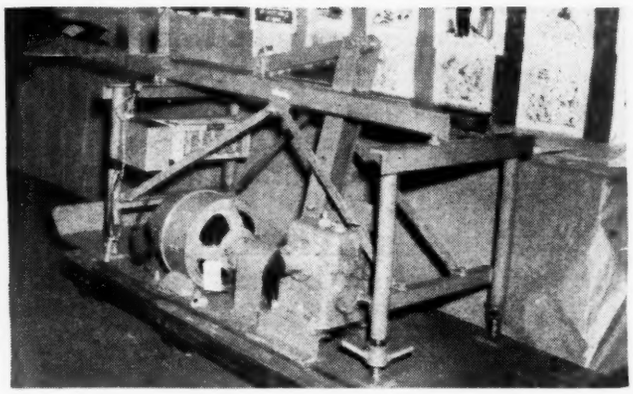
Leveler Boosts Unit Output 2,000 Tons Per Month

In the left foreground is the leveling machine and beside it the nose of the elevator. Here the plate is levelling the coal as the loading progresses and as the car is moved so the heaped coal strikes the plate.



Because of low roof on the way out the leveling plate (left) must be adjusted to within a few inches of the top of the mine car. Stationary in this phase of loading, it starts when the car just beginning to load is moved into its path.

Close-up of the leveling plate in action as a means of increasing the loading of a mine car by the elevator.

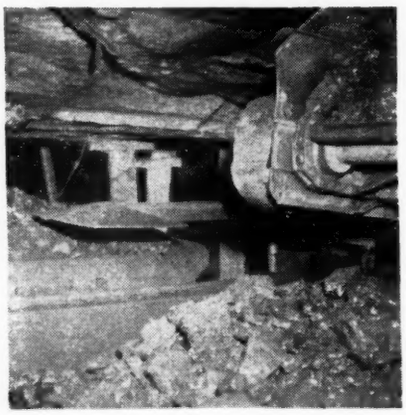


View of the machine on a dolly truck in the gadget booth at the Bluefield, W. Va., industrial exhibit.

FOURTEEN PERCENT greater tonnage per mine car and 2,000 more tons during the first full month of its operation are credited to a leveling machine in use since May, 1945, with a mobile loading unit in a mine of the Gay Coal & Coke Co., Mt. Gay, Logan County, W. Va. This machine relieves the car trimmer of much of the physical effort and therefore he has reason for continuing to be more efficient and alert throughout the shift.

Seam thickness is 44 in. and the primary transportation consists of rubber-tired shuttle cars dumping to an elevator. The track haulage from this section to the tipple headhouse is done with 35 mine cars and the spotting of trips at the shuttle car elevator is done with a rope hoist. Use of headers in some low places on the haulways limits the topping of cars and caused considerable spillage particularly when the car trimmer tried to load the cars close to that limit. With this power-driven leveling machine adjusted to the proper height, the human element is largely eliminated in securing maximum loading of cars without spillage at the lowest place on the haulway. Reduction of spillage saves coal, clean-up labor and adds to mine safety.

The machine consists of a 5-hp. motor, reduction gear, crank disk and connecting rod which reciprocates a leveling plate back and forth across the top of the loaded car.



Trimmer's view of the plate after being stopped upon completion of leveling.

The whole is mounted on a ¾-in. steel skid plate 30 in. by 6 ft. and the upper mechanism is supported on four screw-jack legs which permit adjustment of leveling plate height.

Instead of the machine being set so the leveling plate is under or in the downcoming stream of coal, it is positioned so that the edge of the plate is 12 in. or more away from the side of the elevator nose on the side of the loaded cars. As the filling of an empty car is started the trimmer must still push and rake coal into the corners at the end of the car. After that he can concentrate on moving the trip so the car is topped to a height which is just right so that the leveling plate will fill the corners along the sides without pushing any over as spillage. As the last of the car is loaded the trimmer must again take up his shovel and fill the back corners at that end. He starts and stops the leveling machine from a pushbutton convenient to his trimming position.

The machine can be installed alongside the elevator or across the track, depending on roof conditions and clearances at the loading point.

Before the machine was built the mine-car loading average was 2.9 tons. For the next full month after installation of the machine the average was 3.3 tons and it has been kept close to that figure since.

E. F. Brown, chief electrician for the coal company developed and built the car-leveling machine. Its development as an aid to elevator or conveyor loading into mine cars which must pass under low roof is typical of the progressive policy that Harry S. Gay, vice president and general manager of the Gay Coal & Coke Co. and a pioneer in full mechanical mining in Logan County, has pursued with success throughout his career as a mining engineer and operating executive.

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4. Die-formed to correct curvature for perfect fit

1/4" x 1/4" CROSS SECTION BIT NUMBERS			
LENGTH	SINGLE CHISEL	DOUBLE CHISEL	SINGLE DIAMOND
2-1/16"	60	56	
2-1/8"	54		
2-1/4"	53	51	50
2-1/2"	52	55	49

We make all standard-size bits for any underground or strip mine drilling need, stocked for immediate delivery by the following distributors:

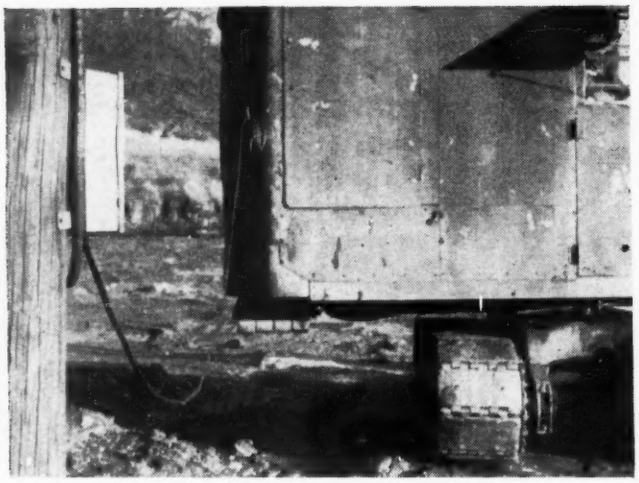
• Austin Powder Company, Cleveland, Ohio • The Buda Company, Harvey, Illinois • Diamond Supply Company, Inc., Evansville, Indiana • Dooley Brothers, Peoria, Illinois • Illinois Powder Mfg. Company, St. Louis, Missouri; Denver, Colorado; Salt Lake City, Utah • Salem Tool Company, Salem, Ohio

DRILLING COALMASTER TOOLS

CENTRAL MINE EQUIPMENT CO.

ST. LOUIS 8, MO.

Strip Heaters on Gasoline Shovel Save Time



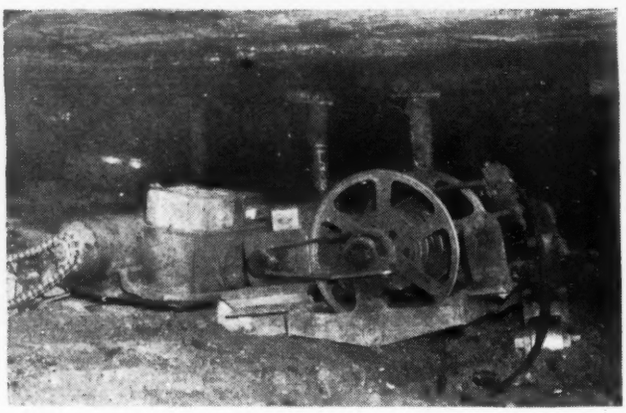
Gasoline shovel put to bed with an electric blanket.

INSTALLATION COST of electrical strip heaters on a gasoline shovel was paid for by the labor saving in one week of cold weather at mines of the United Pocahontas Coal Co., Crumpler, W. Va. This 1-yd. crawler-type shovel powered by a 6-cylinder gasoline engine is used in a windy and exposed location to dump refuse from mine cars along a temporary track along the side of a level refuse pile at the edge of a hollow. By chains hooked to the dipper the cars are upset sidewise, lifted free of the track then set back on the track.

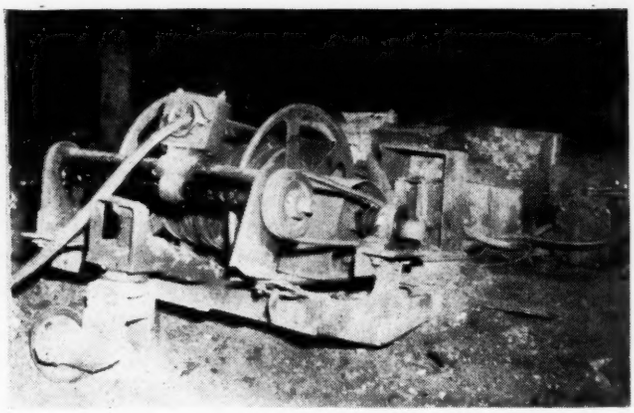
To start that engine in severely cold weather it was necessary to drain out the oil, heat it and put it back into the crank case to warm the engine. Now electric heat turned on only in severe weather keeps the engine warm enough so the dumping crew loses no time in starting their work when they arrive in the morning.

Three strip heaters of 1,000 watts each are used. Two are on the side of the oil pan and one is mounted under the carburetor. The cable, 25-ft. long and permanently connected to the shovel, is kept coiled on a hook on the outside when not in use. Connection is made to a receptacle in a box on a pole, to which the shovel is moved at the end of a shift in cold weather.

Mine Shop Adds Power Reels to Crawler Trucks



Semi-trailer reel attached to crawler truck for transporting shortwall cutter. A crane motor drives the reel shaft by a double V-belt.



Drive from reel shaft to thread bar also is a double V-belt. Semi-trailer weight is about equally divided between caster and hinge at the back.

IMPROVEMENTS in efficiency and safety were made at the Gay Coal & Coke Co., Mt. Gay, Logan County, W. Va., by modernizing the crawler-type self-propelling shortwall trucks with cable reels mounted on semi-trailers. In this trackless mining, in a 44-in. seam with mobile loaders and shuttle cars, time studies showed considerable loss of time in transporting cutting machines from the labor of manipulating trailing cables. Also, damage to the cable with resultant danger and delays was chalked up as an item needing attention.

The cable reels and their trucks were designed and built at the coal company's shop under the direction of E. F. Brown, chief electrician. The base or frame is hinged to the end of the crawler truck (Type T-2) and supported at the back end by a caster or dolly. The wheel, which is of steel, is 7 in. in diameter and has a 5-in. face. The hinge consists of two pivots 20 in. apart.

Capacity of the cable reel is 450 ft. of duplex cable. The thread bar came from a scrapped gathering locomotive. Power to rewind the reel is furnished by a 3-hp. 250-volt d.c. series crane-type motor. When the T-2 traction motor controller is moved to the reverse position it also energizes the 3-hp. reel motor. Eighteen months experience with the trailer reel has proved its practicability for the conditions in the Gay Coal & Coke mines.

Employee-Relation Dividends for Management

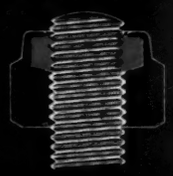
Perhaps you have never realized it, but here is a good place to promote better employer-employee relations. There is hardly a company that is not using some gadget or safety idea suggested by a workman in the organization. Your engineering department, by telling us about these ideas (electrical, mechanical, operating or safety), by whom they were suggested and what the ideas have accomplished, could create an unestimable amount of goodwill in your own company, giving the men responsible for them some well-deserved credit. We feel it will pay good dividends right in your own organization. For each idea accepted, Coal Age, upon publication, will pay $5, or more.

THE FAMOUS *Red Elastic Collar* IS A SYMBOL OF SECURITY

The RED ELASTIC COLLAR is . . .

PERMANENTLY CLINCHED to prevent turning under application and subsequent operational stresses.

PERMANENTLY SECURE against vibration effects. The bolt impresses (does not cut) full contact threads.



PERMANENTLY TIGHT against moisture. Bolt threads have 100% contact in collar — and a full metal seat.

REUSABLE. The Red Elastic Collar retains its grip after repeated usage.

It makes ESNA *Elastic Stop Nuts Self-Locking, Self-Sealing and Reusable*

As a result, all ESNA Elastic Stop Nuts protect assemblies against the effects of: VIBRATION: Elastic Stop Nuts lock in position anywhere on a bolt or stud. Vibration, impact or stress reversal cannot disturb prestressed or positioned settings. . . . CORROSION: Elastic Stop Nuts keep the working threads on the bolt and nut bright and rust-free to protect their strength and permit easy removal without damage to the bolt. . . . THREAD FAILURE: Elastic Stop Nuts dampen impact stresses and materially reduce the shocks against bolt threads that frequently cause metal fatigue. . . . LIQUID SEEPAGE: Elastic Stop Nuts produce a radial-reactive pressure against the bolt threads inside the Red Elastic Collar that makes Elastic Stop Nuts self-sealing against liquid seepage. . . . COSTLY MAINTENANCE: Elastic Stop Nuts are reusable. (Torque tests on aircraft bolts prove that adequate locking torque is maintained through 15 on-and-off cycles.) They do not deform the bolt, damage the threads, gall the finish, or rust.

This wide range of protection permits full purchasing and inventory standardization and its resultant economy. For further information address: Elastic Stop Nut Corporation of America, Union, New Jersey. Sales Engineers and Distributors are conveniently located in many principal cities.

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ANCHOR

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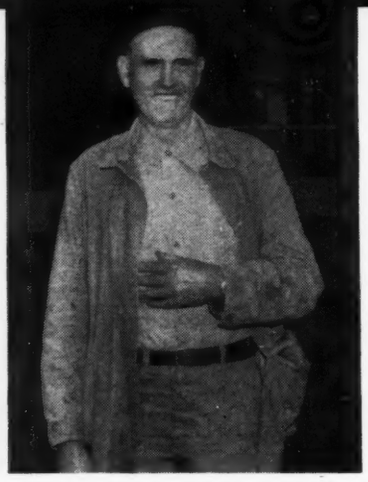
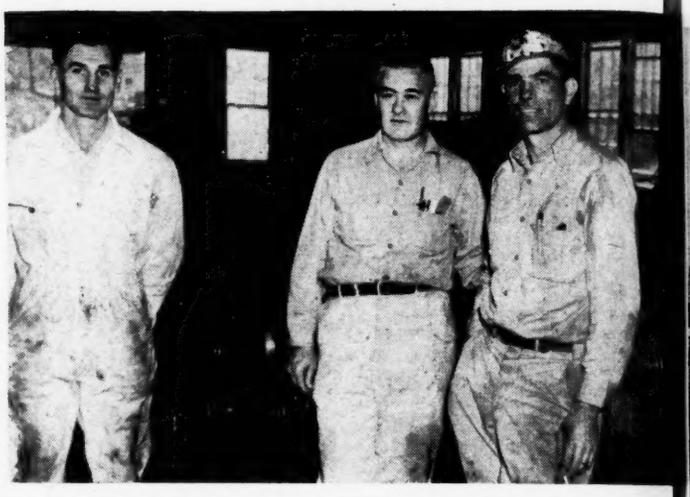
PRODUCTS OF: ELASTIC STOP NUT CORPORATION OF AMERICA

COAL MEN

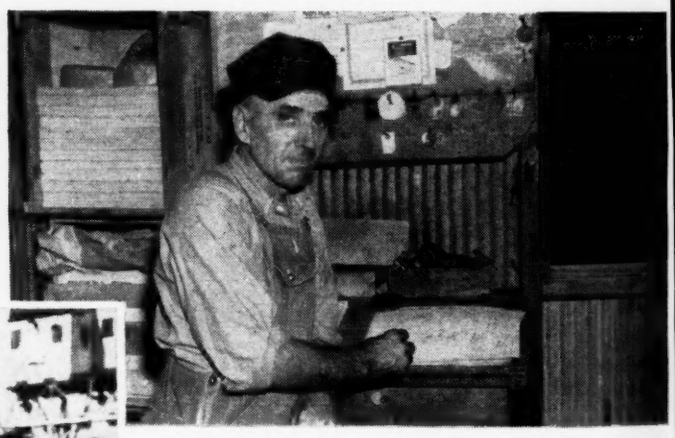


At left—T. W. Pearson, general superintendent, Little Sister mine, Little Sister Coal Corp., St. David, Ill. Right—E. H. Scaggs, outside foreman, Big Creek Coal Co., Big Creek, W. Va.

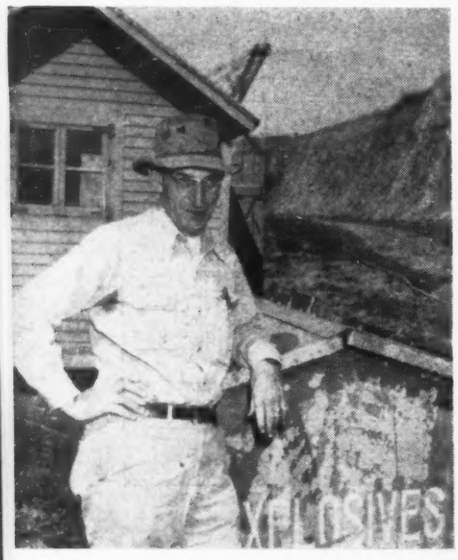


Walter Lyttle (left), shop foreman, E. P. Reed, maintenance engineer, and W. H. Seelinger, general superintendent, Crichton No. 4 mine, Johnstown Coal & Coke Co., Nettie, W. Va.

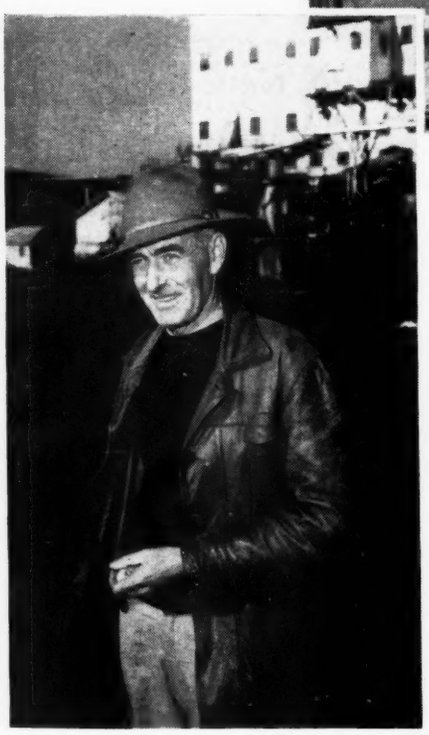
Gene Long (left), top foreman and Howard Somers, office manager, Red Ember mine, Truax-Traer Coal Co., Fiatt, Ill.



J. C. Presbyterial, partner, New Gladstone Coal Co., Numa, Iowa.



J. W. Bullington, pit foreman, Red Ember mine, Truax-Traer Coal Co., Fiatt, Ill.



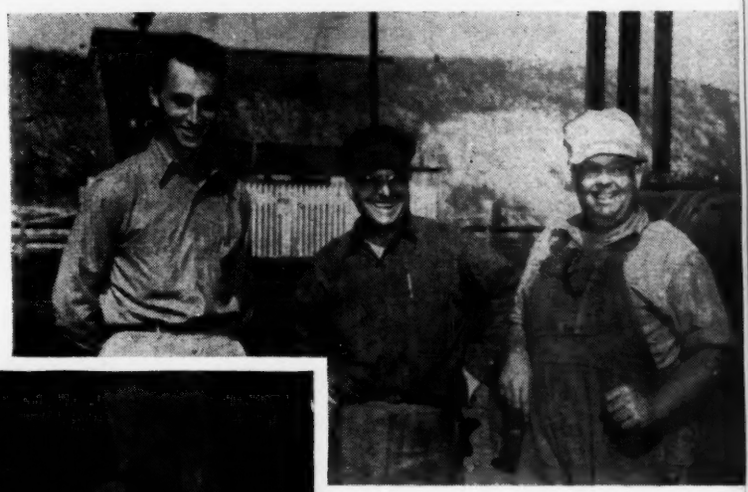
Elbert Steele (left), general mine foreman, and A. F. Winters, superintendent, Big Creek Coal Co., Big Creek, W. Va.

E. B. Campbell, superintendent, Buckheart mine, The United Electric Coal Cos., Canton, Ill.

ON THE JOB

H. C. Weaver (left), general superintendent, W. H. Fowler, electrician, and Harry Anglin, belt repairman, Panther No. 5 mine, Panther Coal Co., Marybill, W. Va.

Harry S. Gay, vice president and general manager, Gay Coal & Coke Co. and Gay Mining Co., Gilbert, W. Va.



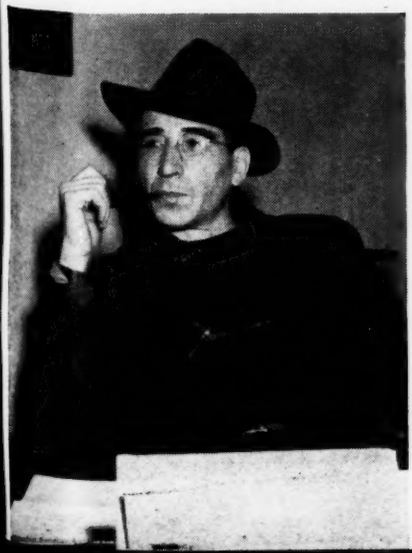
Elmer Martin, chief electrician, Red Ember mine, Truax-Traer Coal Co., Fiatt, Ill.

C. D. Van Liew (left), supply clerk, Thomas Duddy, tipple foreman, and E. C. Carlton, track foreman, Red Ember mine, Truax-Traer Coal Co., Fiatt, Ill.

S. R. Friend, chief electrician, Kanawha Coal Corp., Eskdale, W. Va.

Below—Ellis Maxwell, superintendent, Flamingo mine, Fairview Collieries Corp., Fairview, Ill.

Leonard W. West, assistant superintendent, Little Sister mine, Little Sister Coal Corp., St. David, Ill.



E. L. Dooley (left), and J. C. Cathcart, partners, Dooley & Cathcart, Centerville, Iowa.

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Here's what you've been waiting for! Thermoid has developed and produced new, specially engineered brake linings for industrial service. The line comprises materials suitable for *all* types of industrial installations.

This eliminates the necessity of using incorrect lining with the resulting headaches and expense of frequent "tear-downs" and poor braking action.

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Thermoid

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News Round-Up

Fourth Coal Mine Nationalized by CMA

Bituminous production continued at a high rate during January, with no new action toward an industry-negotiated contract to replace government seizure, as operators, the U.M.W. and the Government awaited developments on labor legislation from the new Congress and the outcome of the Lewis-U.M.W. contempt case heard by the Supreme Court Jan. 14.

In line with a policy reportedly designed to strengthen compliance with the Krug-Lewis agreement, the Coal Mines Administration Jan. 7 announced the "nationalization" of a second coal mine, removing Ralph A. Fox, owner of the Fox Coal Co. Mine No. 3, Monongalia County, West Virginia, as operating manager and taking over the mine "for the account and risk of the government." The government had announced Dec. 31 that it was similarly taking over three mines of the Carter Coal Co., McDowell County, West Virginia, for failure to set aside money for the welfare royalty as provided under the Krug-Lewis contract.

The Fox mine, which employs about 20 men and produces 250 tons daily, was cited for refusal to "comply with provisions of the Krug-Lewis agreement covering wages, working conditions, hiring and firing." Contending that Secretary of Interior Krug exceeded "constituted authority" in seizing the mine, Fox Jan. 11 asked the Northern West Virginia district court for an order requiring return of the mine to him. He maintained that despite the power vested in the President to take over the mines during the recent emergency, the right did not extend to administrative officers, empowering them to confiscate by force, and if such power exists, they could only enforce it by going into court. He further maintained that he was not bound by the government's contract with the U.M.W.

Among the welter of labor legislation, introduced or under consideration by the 80th Congress during its first month, was a bill introduced Jan. 20 by Rep. Gerald W. Landis (R., Ind.), to continue the Government's power of seizure of vital industries threatened by strikes. Public-welfare industries such as coal mining, steel and public utilities, but excepting railroads, would be subject to seizure if they failed to submit disputes to arbitration or if arbitration was not successful, with the Government authorized to confiscate profits for the period of its operation.

In an attempt to place operation of the mines under federal supervision, Sen. Kilgore (D., W. Va.) has introduced a bill that would amend the Federal Mine Inspection Act of 1941 and authorize the Secretary of Interior, acting through the U. S. Bureau of Mines, to prescribe reasonable regulations "establishing standards and requirements necessary and appropriate for the prevention or amelioration of unhealthy or unsafe conditions, accidents or occupational diseases in coal mines. . . Such regulation may provide, among other things, that the operation of any such mine may be suspended in whole or part upon the order of a coal-mine inspector if he finds in a mine an unhealthy or unsafe condition which is specified in such regulations as grounds for such suspension."

Interested persons would have an opportunity to present their views on the regulations before they were made effective and violation of the regulations would carry a fine of not more than $5,000 or imprisonment of not more than a year, or both. The act would also provide for application for a court order enjoining any act or practices thought by the Secretary of Interior to be a violation of the safety regulations, for an order enforcing compliance, or for a restraining order "upon a showing that such a person has engaged or is about to engage in any such acts or practices."

•

Case Asks Congress Study Coal Industry

Investigation of the wage, safety, housing and general conditions in the mining and distribution of soft coal, anthracite and sub-bituminous coal, in preparation for possible legislation to deal with the industry in the event of another nationwide work stoppage March 31, was proposed in a concurrent resolution introduced in the House of Representatives Jan. 6 by Rep. Francis Case (R., S. D.). The inquiry would be made by the Committee on Education and Labor of the House and the Senate, and they would be required to report to their respective bodies by March 1.

According to Rep. Case, Congress should find out whether conditions in coal mining are different from those in industry generally, and this should be done in time to do something before the March 31 deadline. The resolution was referred to the House Committee on Rules for action.

National Coal Board Takes Over British Mines

British Combine

Members of the National Coal Board, pictured Jan. 1 as they officially took over control of Britain's coal mines, are, left to right: Sir Charles Ellis, science; T.E.B. Young, production; Sir Charles Reid, production; Sir Arthur Street, deputy chairman; Lord Hyndley, chairman; Lord Citrine, manpower and welfare; Ebby Edwards, labor relations; and J. C. Gridley, marketing.

Solar Energy Applied To Home Heating

Practical utilization of the sun's rays for the heating of homes and buildings is seen as the result of a research project sponsored by the War Production Board and carried out by the engineering experiment station of the University of Colorado, according to the February, 1947, issue of *Federal Science Progress*, published by the U. S. Department of Commerce. Experiments indicate that a new type of solar-heat collector, simple and inexpensive in construction, can serve as an auxiliary heating unit for the average small house, cutting winter fuel bills as much as one-half in advantageous locations.

The device used to collect heat from the sun in these tests uses the same heat-trapping principle as a greenhouse. Ordinary glass, which is transparent to visible light and the shorter infrared heat rays of sunlight, is opaque to heat rays of longer wave length. Sunlight shining through the roof of a greenhouse strikes the objects inside and warms them. When warm they reradiate heat of a longer wave length, which cannot be dissipated through the glass, and the interior of the greenhouse is warmed.

In the new heat trap, large panes of glass, mounted in a shallow glass-covered box, are overlapped like shingles, with the upper third of each pane coated with a heat-absorbing paint. Sunlight strikes through the glass, warming the coated parts, but the reradiated heat cannot escape back through the glass cover. The air in the box, heated to as much as 200 deg. F., is piped into an ordinary hot-air distributing system.

The Colorado experiments carried out last winter with an actual installation showed savings of up to 20 percent on the fuel bill. But in the test set-up much of the heat was wasted. Because there were no facilities for storing the heat generated, it operated only during the daylight hours and at night the regular furnace had to take over. And in the middle of the day, when the solar heat was at its peak, the system shut down automatically to avoid overheating the house, so that a good proportion of the heat was thrown away.

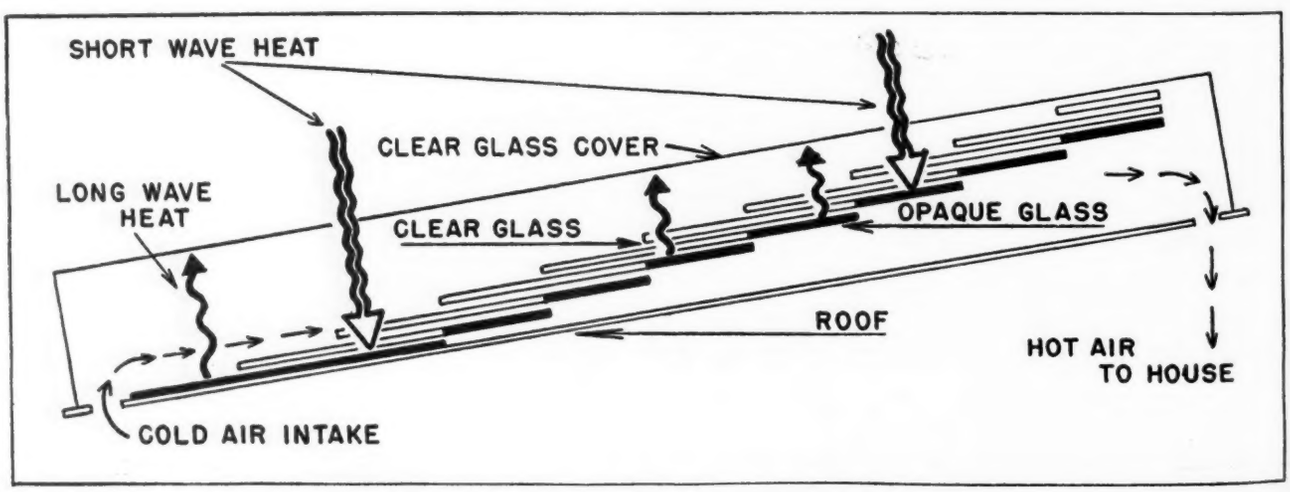
Researchers working on the heat trap believe that a simple heat-storage system could smooth out the heat flow, so that sunlight could provide two-thirds of the heating requirements of an ordinary house in a climate with severe but sunny winters. The storage chamber they suggest is an insulated compartment of about 15-cu.yd. capacity, loosely filled with solids like brickwork, coke or stone, which could be located in or under the house.

The possibilities of the heat trap are not limited to winter heating. It can give ample hot water for a family on a year-round basis. It could also be used with any of the commercially available refrigerating air conditioners of the absorption type to cool the house during the summer. This application would be particularly useful in the South, according to the publication, where there is tremendous available solar energy in the months when cooling

Press Association

Gasification Tests Start in Alabama

While research men and officials of the U. S. Bureau of Mines look on, smoke pours from the exhaust of a test mine on the Gorgas properties of the Alabama Power Co., as experiments in the underground gasification of coal began last month. The underground fire was started by two small incendiary bombs.



The "greenhouse" principle that traps the sun's rays for house heating.

Securityflex Mine Cable

CUTS SHORT CIRCUITS

IMPORTANT SAFETY FEATURES

ANTI-SHORT BREAKER STRIP minimizes shorting under tension or compression . . . anchors jacket to conductor insulation.

FLAME-RESISTANT JACKET with seine twine reinforcing resists abrasion and tearing, is bonded to conductor insulation.

D-SHAPED CONSTRUCTION prevents one conductor riding over the other, eliminates twisting.

SPECIAL, anti-short breaker strip construction and tough, flame-resistant Neoprene outer jacket are your protection against short circuits and overloads when you use Securityflex mine cable. Securityflex will not support combustion . . . won't kink, twist or tear . . . stands up under long abuse and severe overloads . . . assures long, uninterrupted mine service.

47436

ANACONDA *Securityflex* **CABLE**

ANACONDA
from mine to consumer

is most needed for the most in comfort.

Development work on the heat trap is continuing under private sponsorship. The most important problems to be solved are the design of a heat-storage unit and finding a way to minimize the breakage of the glass collector plates from expansion and contraction.

•

Safe Foremen Lauded At Red Jacket Dinner

In celebration of an improved safety record, 140 supervisors of the Red Jacket Coal Corp.'s mines near or at Red Jacket, W. Va., were entertained by the management at a steak dinner Sunday, Jan. 12, at the Mountaineer Hotel, Williamson, W. Va. A dinner for supervisors of the company's other mines was scheduled for Bluefield, W. Va., the following Sunday.

Foremen who supervised sections in which no lost-time accident occurred during 1946 were each asked to stand and take a bow. These were: Haywood Dean, Fred Sears, J. Carl Cook, James Martin, D. B. Hammond and William Ball (Junior mine); Ed Blankenship and D. E. Edmonds (Mitchell Branch No. 32 mine); Wiley Hood and Okey Tiller (No. 6 mine). Before introducing each foreman, C. P. Ferguson, safety director, giving due credit to the individual for his part in the safety improvement, read the names of all men on the foreman's crew.

Mr. Ferguson announced that Feb. 1 a new system of safety recognition for foremen would be put into effect. So that a top-notch foreman gets proper recognition even though there may have been a minor accident, he accumulates merits and demerits toward a final rating for the year, under the new plan.

J. J. Maurice, preparation manager and toastmaster, introduced P. D. Ritter, president, J. R. Kirby, general manager, E. F. Smith, superintendent, A. F. Cook, superintendent, and J. J. Plasky, training director, who spoke briefly. A. U. Miller, supervising engineer, District No. 4, U. S. Bureau of Mines, Mt. Hope, W. Va., addressed the group on the general aspects, aims and importance of safety supervision. Visitors introduced included: C. E. Linkous, chief coal mine inspector, U. S. Bureau of Mines; Pat Heatherman, mine inspector, West Virginia; L. G. Fitzgerald, mining explosives engineer; and J. H. Edwards, associate editor, *Coal Age*.

A. U. Miller, supervising engineer, District No. 4, U. S. Bureau of Mines, Mt. Hope, W. Va., speaks at the Williamson dinner meeting. At the right is J. J. Maurice, preparation manager, and left, P. D. Ritter, president of the company.

Speaker and Red Jacket officials at the Williamson dinner are: front row, left to right, P. D. Ritter, president, J. H. Kirby, general manager, R. A. Ison, assistant chief mining engineer and A. U. Miller, supervising engineer, District No. 4, U. S. Bureau of Mines, Mt. Hope, W. Va. Standing, C. P. Ferguson, safety director, E. F. Smith, superintendent of Mitchell Branch mines, John Maurice, preparation manager, J. J. Plasky, training director and A. F. Cook, superintendent, Junior mines.

•

New Developments

• Purchase by the Bethlehem Steel Corp. of all coal lands between Barrackville and Rachel, in Marion County, West Virginia, owned by the Jamison Coal & Coke Co., Greensburg, Pa., at a price of $3,000,000, was reported Jan. 17

Frank R. Amos, Fairmont, W. Va., attorney for Bethlehem, who filed the transfer deed, said that all coal purchased between Barrackville and Farmington would be mined by the Industrial Collieries Corp. mine at Barrackville, and that that lying between Farmington and Rachel would be produced by the company's Carolina mine. It was estimated that the additional reserves would prolong the life of the Barrackville mine 35 to 40 years and that of the Carolina mine 30 years.

Jamison officials stated that the company's No. 8 mine at Farmington, closed during the strike last spring, would not be reopened, but that operations would be continued at its No. 9 mine near Farmington and at its No. 10 mine at Rachel.

• Opening of a new mine with an anticipated production of 3,000-5,000 tons daily near Westover, Pa., in Cheat Creek Valley, has been announced by the Cambia-Clearfield Mining Co., a subsidiary of Peale, Peacock & Kerr, Inc., St. Benedict, Pa. The new operation, to be known as the Springfield No. 6 mine, is being developed on a 10,000-acre tract said to contain an exceptionally good grade of high-fusion coal in a 3½-5-ft. seam.

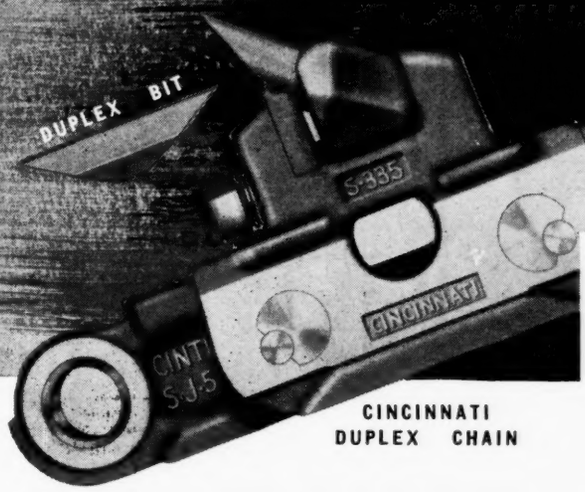
The opening is being made along Kings Run and the tipple to be started soon will have three loading tracks. Acquisition and exploration of the property has been supervised by R. W. Scollon, chief engineer, and T. L. Stafford is general superintendent of the new mine.

• Continuation of its operation of the Nesquehoning colliery on a trial basis until March was recently announced by Evan Evans, vice president and general manager, Lehigh Navigation Coal Co., Lansford, Pa. The mine had been operated under lease by the Edison Anthracite Coal Co. from February, 1939, until the end of 1946, when Edison Anthracite did not renew the lease.

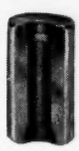
Lehigh Navigaton officials told miners that the firm was "willing to operate the colliery at only a slight profit" but unless production was stepped up during the trial period, the colliery breaker would be abandoned. Mr. Evans said that "the future of the colliery depends upon the cooperation of every single worker." The

WHY

CINCINNATI CHAINS AND BITS OUT-PERFORM ALL OTHERS...



CINCINNATI
DUPLEX CHAIN



Hardened Eccentric Pin puts joint wear between pin and insert . . . doesn't turn in block. With replacement of pin and insert the joint is like new.

Alloy steel, heat treated Rivet holds bearing pin against longitudinal displacement. Easily removed.

Easily replaced, hardened alloy steel Connector Insert gives fresh from the factory joint accuracy to worn connector.

- The Cincinnati Duplex Chain as well as the Cincinnati Standard Chain is engineered for a minimum of power consumption and a maximum life.
- Cincinnati Chains, made of the finest alloy steel, are engineered to place wear and tear on inexpensive easily replaceable parts.
- Cincinnati Chains because of superior design, engineering and metallurgical perfection require a minimum of servicing
- The Cincinnati double-ended reversible Duplex Bit greatly reduces bit setting time. Duplex Bits are firmly locked into chain avoiding loss of bits and loss of time.
- Cincinnati Duplex Bit eliminates sharpening operations and out-cuts ordinary Mine Sharpened Bits from 2 to 6 times per point.

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WHEN OVERLOADS DEMAND "SOMETHING EXTRA" from mine motors, make sure that they have something extra to protect them from overheating and burnouts. There's no better Class B insulation than Deltabeston* magnet wire. Many leading mines have made Deltabeston a standard specification for motor rewinding and repair.

The Deltabeston line of magnet wires includes both asbestos and glass-insulated types, round, square, and rectangular, in a full range of sizes. It is the product of top-rank experience in heat-resistant wire. Our engineers can give you practical, point-of-use advice for any combination of operating conditions. Deltabeston wires and cables are widely available when you need them.

For complete information on Deltabeston magnet wire and other products "built to beat the heat," write Section Y50-214, Appliance and Merchandise Department, General Electric Company, Bridgeport 2, Connecticut.

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*Trade-mark Reg. U.S. Pat. Off.

GENERAL ELECTRIC

Coal Activity

Bituminous Coal Stocks

	Thousands Net Tons Dec. 1, 1946	P.c. change From Nov. 1, 1946	P.c. change From Dec. 1, 1945
Electric power utilities	14,549	−7.0	−3.8
Byproduct coke ovens	6,355	−3.6	+37.9
Steel and rolling mills	877	−1.2	+44.9
Railroads (Class I)	7,587	−18.2	−24.5
Other industrials*	20,178	+5.4	+41.2
Retail dealers	2,883	−15.0	−31.8
Total	52,429	−4.5	+7.1

Bituminous Coal Consumption

	Thousands Net Tons Nov., 1946	P.c. change From Oct., 1946	P.c. change From Nov., 1945
Electric power utilities	6,447	−3.9	+17.6
Byproduct coke ovens	6,992	−10.5	+2.8
Steel and rolling mills	799	−6.0	−1.1
Railroads (Class I)	8,879	−7.2	−9.9
Other industrials*	12,289	+4.4	+5.7
Retail dealer deliveries	9,115	−8.7	−3.9
Total	44,521	−4.7	+1.0

* Includes beehive coke ovens, manufactured-gas plants and cement mills.

Bituminous Production

December, 1946, net tons	42,320,000
P.c. change from November, 1946	+13.1
Jan.-Dec., 1946, net tons	532,000,000
P.c. change from Jan.-Dec., 1945	−7.9

Anthracite Production

December, 1946, net tons	5,080,000
P.c. change from November, 1946	+1.8
Jan.-Dec., 1946, net tons	60,685,000
P.c. change from Jan.-Dec., 1945	+10.3

Sales, Domestic Stokers Vs. Oil Burners

	Stokers	Oil Burners
November, 1946	14,555	63,076
P.c. change from November, 1945	−29.5	+169.8
Jan.-Nov., 1946	171,193	419,071
P.c. change from Jan.-Nov., 1945	+61.5	+233.5

Index of Business Activity*

Week ended Jan. 25	190.2
Month earlier	187.8
Year earlier	153.7

* *Business Week*, Feb. 1.

Electric Power Output†

Week ended, Jan. 25, kw.-hr.	4,856,404,000
P.c. change from month earlier	+9.3
P.c. change from year earlier	+20.4

†Edison Electric Institute.

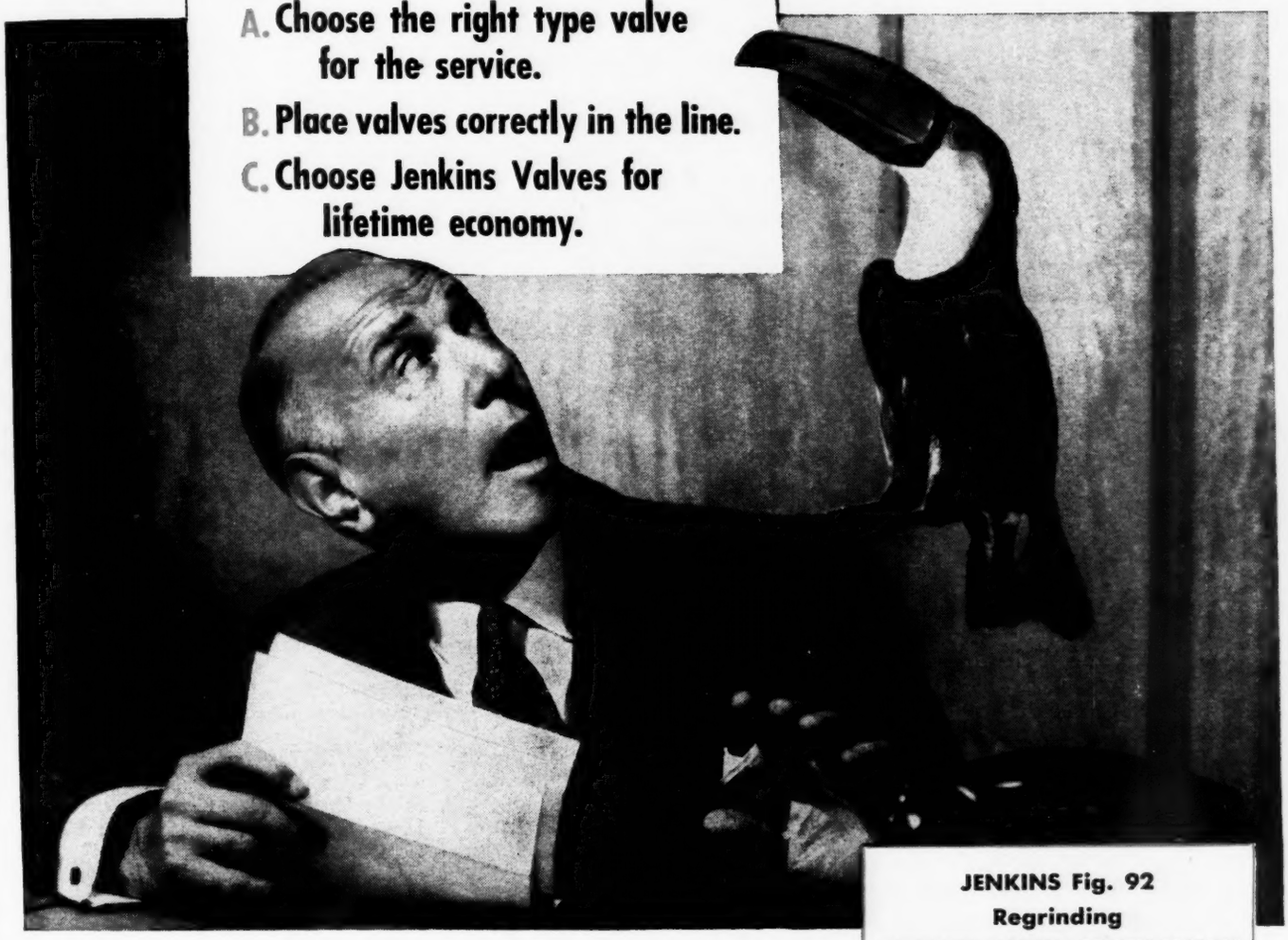
Nesquehoning colliery local pledged full cooperation and voted to exercise every effort to make profitable operation of the mine possible.

• Coal lands in Mason, Putnam and Jackson Counties, West Virginia, totalling 3,481 acres, reportedly have been sold to the Carbide & Carbon Chemicals Corp., New York, by Yawkey & Freeman Coal Co.

• A new Routt County, Colorado, mine has been opened by the Routt-Curtis Coal Co., in Curtis gulch, near Milner. A tipple has been constructed and the mine now is supplying the truck trade, according to reports. Tom Allen Jr. is mine superintendent and Bud Early, foreman.

Development of the new operation is to be pushed and it is expected to become one of the biggest producers in the County, according to reports. The company has 1,120 acres under lease and estimates show reserves of 15 to 20 million tons of coal, it is said. The property contains every seam of coal in the middle and lower series of coal-bearing formations of Routt County.

It's Simple to avoid a Big Bill for valve upkeep!


A. Choose the right type valve for the service.
B. Place valves correctly in the line.
C. Choose Jenkins Valves for lifetime economy.

THESE three, simple, basic rules, plus intelligent treatment and care of valves, are paying extra dividends in valve economy to more and more valve users in every industry.

By choosing Jenkins Valves, you get not only valves made with extra endurance that means extra economy, but also expert advice of top-rated valve specialists, Jenkins engineers, on any question of valve selection or placement for any service.

Base your valve buying on this ABC formula for *lowest cost in the long run.*

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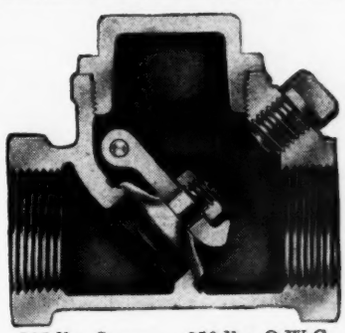
JENKINS Fig. 92
Regrinding
BRONZE SWING CHECK VALVE



125 lbs. Steam 250 lbs. O.W.G.

Designed for service on non-return control systems; especially with Gate Valves, where a comparable full, free flow of steam, oil, water, or gas is required. It is also widely used for condensate and return lines. The high tensile bronze disc is carefully machined to a smooth, tight-fitting finish, can be reground easily without removing valve from line.

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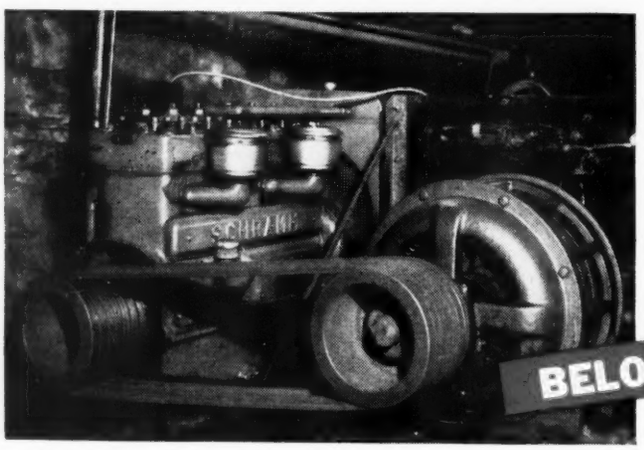


BELOW

Write today for performance and construction details on these rugged, dependable units. We believe Schramm compressed-air-power will help make your mining operations easier.

SCHRAMM INC. THE COMPRESSOR PEOPLE WEST CHESTER PENNSYLVANIA

EQUIPMENT APPROVALS

Two approvals of permissible equipment were issued by the U. S. Bureau of Mines in December, as follows:

Joy Mfg. Co.—Type U-166-47E belt conveyor; 40-hp. motor; 250 volts, d.c.; Approval 568; Dec. 6.

Goodman Mfg. Co.—Type 460BH loader; two motors, 50- and 8-hp.; either 250 or 500 volts, d.c.; Approvals 569 and 569A, respectively; Dec. 20.

• The Panther Coal Co. of West Virginia has been formed as a subsidiary of the Panther Coal Co., Inc., Marybill, W. Va., with a capital of $500,000. W. S. Leckie is president, A. F. Leckie, vice president, and W. B. Beale, secretary-treasurer. The operation will be located at Marybill, Nicholas County, W. Va.

•The formation of the Adams Mills Coal Co., to mine coal near Coshocton, Ohio, has been reported. The incorporators are Floyd Anderson, Carew Tower, Cincinnati, Charles Sulau and Helen June Shotwell.

• The Beaver Creek Consolidated Coal Corp., Lexington, Ky., capital $100,000, has been formed as a result of a merger of Kentucky and West Virginia firms of the same name, it is reported.

• The Laurel Fork Coal Co., lessee of coal property in the Richlands-Doran-Raven area of Tazewell County, Virginia, is reported to have contracted with the George F. Hazlewood Construction Co., Cumberland, Md., to begin what is thought to be the first strip mine of any large size in that area. The seam to be worked lies up Mudlick and extends over to the former Raven Coals property and loading docks will be located on the site of the razed tipple of that company. Equipment has been received and development begun, it is reported.

• Commercial production has been started by the Susquehanna Collieries Co. at its new anthracite-fine flotation plant located at No. 7 colliery, Nanticoke, Pa. The entire output of the plant is to be used by the Luzerne County Gas & Electric Corp., at its Hunlock Creek generating plant, which now has under construction a new modern boiler installation for the burning of pulverized anthracite.

MEETINGS

• A.I.M.E.: World Conference on Mineral Resources, March 17-19, Waldorf-Astoria Hotel, New York.

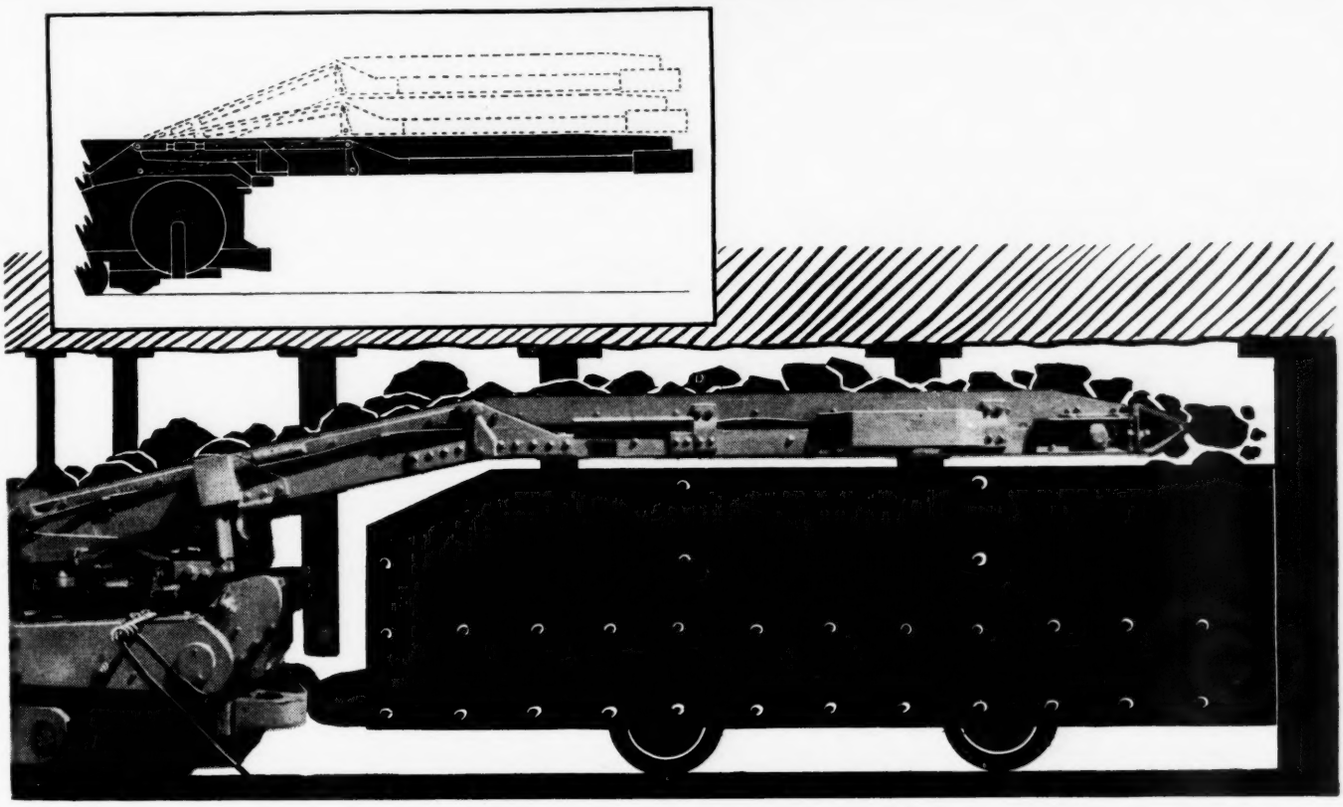
• Fifth Anthracite Conference, Lehigh University: May 8-9, Bethlehem, Pa.

• American Mining Congress: annual convention and exposition May 12-15, Cleveland Auditorium, Cleveland Ohio.

• Rocky Mountain Coal Mining Institute: spring meeting May 26-28, Utah Hotel, Salt Lake City.

LIMITED HEAD ROOM

—Another reason why you need the WHALEY "AUTOMAT"



If your head room is limited, you can load cars having the greatest possible capacity and load them heavier, with the Whaley "Automat". Only the "Automat" gives you the advantage of the Parallel Lift Rear Conveyor . . . the conveyor that, regardless of height of car, is always parallel to track and top of car, for its full length extending over car. Hydraulic controls place the conveyor at proper height but the parallel feature is automatic.

This feature of the "Automat" is a very definite advantage in many installations. A glance at the detail illustrations above show how it may be valuable to you.

In addition, the wide conveyors on the "Automat" give you maximum capacity at a speed which avoids excessive wear. And remember, "Automat" conveyors and shovel loading head will handle, in their stride, any lump of coal that will pass thru your tipple, or any lump of rock your cars, aerial tram or larries can take. Myers-Whaley Co., 129 Proctor, Knoxville 6, Tenn.

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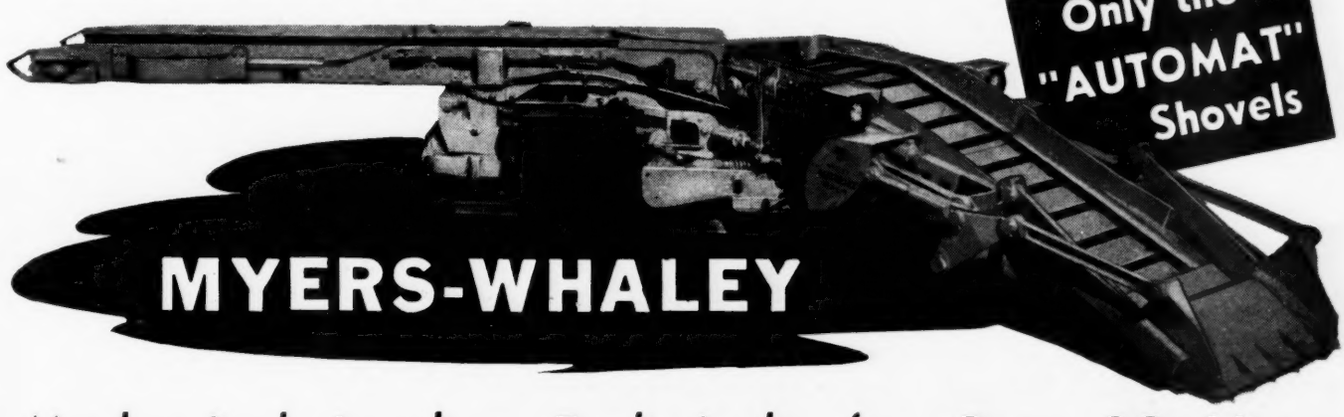

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TWIN CITY NEstor 7311
NEWARK (1) BIgelow 3-5920
REctor 2-6560 BErgen 3-1614

UNITED STATES STEEL

C. & O. to Purchase Ten Coal Locomotives

Plans for the purchase of ten additional coal-burning passenger locomotives for use on new streamlined trains included in its passenger-service modernization program were recently announced by the C. & O. Ry. The C. & O. already has on order 40 coal-burning freight locomotives being built by American and Lima Locomotive Works, as well as three passenger locomotives of the steam-turbine-electric type being built at the Baldwin Locomotive Works and intended for two new streamliners planned for next year.

•

G. M. Eyes Gas Turbine To Replace Diesel

The possibility of gas-turbine locomotives replacing diesel locomotives is being studied by the Electro-Motive Division of the General Motors Corp. and other locomotive manufacturers, C. R. Osborn, General Motors vice president, said Jan. 24 before a joint luncheon of the Traffic Club of Chicago and the Mid-West Shippers' Advisory Board. If this new type of engine can be successfully designed and manufactured with "cost economies and reliability equal or better than the diesel," Mr. Osborn said, General Motors will then manufacture gas turbines in the place of diesels.

•

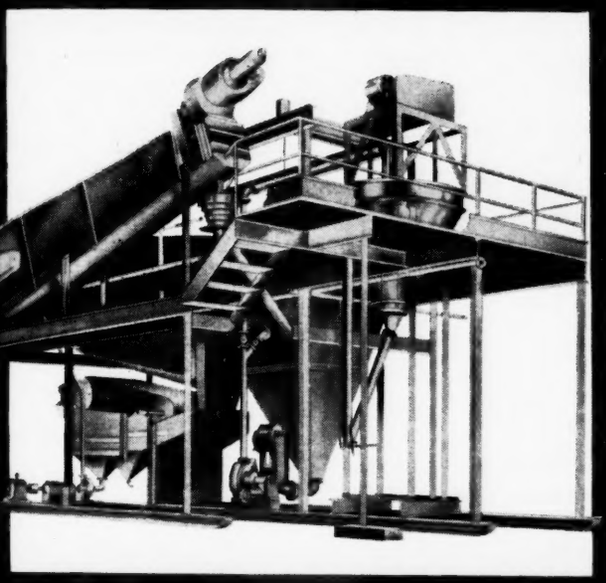
Pennsylvania Orders 25 Main-Line Diesels

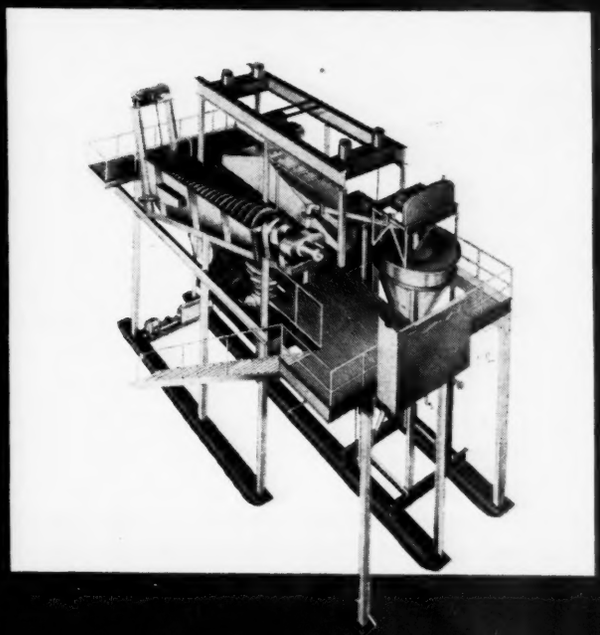
As a part of a $30,400,000 program to replace its through-service fleet of coal-burning steam-powered locomotives, the Pennsylvania R.R. announced Jan. 22 placing of orders for 25 diesel-electric locomotives at a cost of $15,000,000. Orders for 22 other diesel-electric locomotives have previously been placed, the announcement said, and the first delivery is expected shortly.

Six freight and five passenger locomotives in the orders just placed will be built by the Electro-Motive Division of General Motors, nine passenger engines by the Baldwin Locomotive Works and five by the American Locomotive Co. The 19 passenger locomotives will be of 6,000 hp., with three 2,000-hp. units, and the six freight engines will have five 1,500-hp. units for a total of 7,500 hp. each.

Declaring that it is "keeping fully abreast of every modern development in all forms of motive power," the Pennsylvania said that it expects to place diesels in large-scale operation on its main-line hauls from Harrisburg, Pa., to Chicago and St. Louis. While the diesels "certainly will be more economical," it was said, company spokesmen emphasized that the road is not abandoning steam locomotives and pointed out that 75 modern multi-cylindered coal-burning steam locomotives have been delivered in recent months. The Pennsylvania also is collaborating in the development of the coal-burning gas-turbine locomotive, now being built under BCR auspices.

WKE (HMS) "Mobil-Mill"





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HMS "Mobil-Mill" opens the door to new profits for mining operations where the HMS process is applicable. Engineered and designed by authorities on HMS plants, "Mobil-Mill" embraces the wealth of experience and operational data gained by WKE engineers in their construction of HMS mills throughout America. The selection of the equipment for "Mobil-Mill" is based on the analysis of practical application of HMS equipment in operating plants throughout the industry.

5 Ways to capitalize on the HMS process with "Mobil-Mill"

1. **Use "Mobil-Mill"** as a pilot plant.
2. **Use "Mobil-Mill"** as a plant starter—as an immediate producer of "shipping" ore.
3. **Use "Mobil-Mill"** where extent or size of ore body does not justify capital expenditure.
4. **Use "Mobil-Mill"** for working dumps.
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PACKAGED: Prefabricated for ease of erection. Pre-engineered for balanced pulp-flow.

COMPACT: Small area required—12½' W x 26' L x 13½' H on its own foundation.

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I-T-E Automatic Reclosing Circuit Breakers have one function—*protection*. They guard against overload conditions in trolley and feeder circuits. They automatically open when currents become excessive and *automatically close* when line conditions return to normal.

Properly arranged, they protect feeder and equipment in every mechanized section by detecting disturbances and isolating the troubled area. They keep short circuits from being fed by distant substations, and minimize danger of fire and damage.

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Let I-T-E Sectionalizing Switchgear protect your mine.

Send, today, for new Bulletin 4611 to I-T-E Circuit Breaker Company, 19th and Hamilton Streets, Philadelphia 30, Pa. Find out how you can insure against damage resulting from electrical disturbances.

SECTIONALIZING SWITCHGEAR

SFA Closing

Operation of the Solid Fuels Administration will be suspended March 31, if another strike emergency does not interfere, Dan H. Wheeler, deputy administrator, announced Jan. 8.

•

Diesels 95 Percent Of New R.R. Orders

Intensified competition by oil in coal's railroad markets was indicated last month in an announcement by Robert B. McColl, president, American Locomotive Co., that 95 percent of all new locomotive orders by the nation's railroads were for diesel-electrics.

The trend to diesels has been much more rapid than anyone in the industry had expected, according to Mr. McColl. Twelve years ago, he said, only 20 percent of the new orders were for diesels. Now most of the 5 percent for steam are designed for use on railroads that derive most of their freight revenue from coal haulage.

Steam locomotives now in service outnumber diesels 19 to 1 but every new diesel pushes two or three steam locomotives off the rails because of its operating advantages, Mr. McColl said. While an overnight disappearance of the steam locomotive cannot be expected, there is no long-term future for coal on the railroads unless experiments now being conducted in the use of powdered coal in a gas-turbine engine prove successful, he said. Present equipment of all coal-burning types is valued at nearly $2,000,000,000 and would take many years to replace.

•

Hazleton to Be Site Of Anthracite Study

Hazleton, Pa., has been selected as the site for the U. S. Bureau of Mines' new $450,000 anthracite-research laboratory, it was announced Jan. 10 by Secretary of the Interior J. A. Krug.

In choosing the Hazleton site, Secretary Krug accepted the unanimous recommendation of the three-man Advisory Committee on the Anthracite Research Laboratory, appointed under a congressional act providing for establishment of the laboratory. This committee comprised Dr. J. A. Goff, dean of the Towne Scientific School of the University of Pennsylvania, representing the public; Thomas Kennedy, secretary-treasurer of the U.M.W., representing the coal mine workers; and Frank W. Ernest Jr., president, Anthracite Institute, representing the operators.

The site for the new laboratory is a 20-acre tract in a developing residential section, on the outskirts of Hazleton. Thirty-five prospective sites in Pennsylvania were surveyed carefully by the Bureau of Mines and studied by the advisory committee after funds were appropriated for the laboratory last summer, Secretary Krug said.

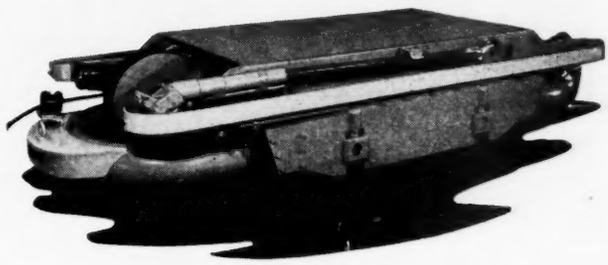
In 1942 Congress authorized (Public Law 812—77th Congress) the Department of the Interior and the Bureau of

THE CANTRELL "S-P" TAKES MEN, TOOLS and AIR WHERE YOU WANT THEM...WHEN YOU WANT THEM... ALL UNDER ITS OWN POWER

There's no longer any need for tying up heavy locomotives in transporting compressors to the job. The dependable Cantrell, Type S-P, is a completely independent compressor. Self Propelling, it takes men, tools and compressor to the job, does its work and brings you back . . . all under its own power.

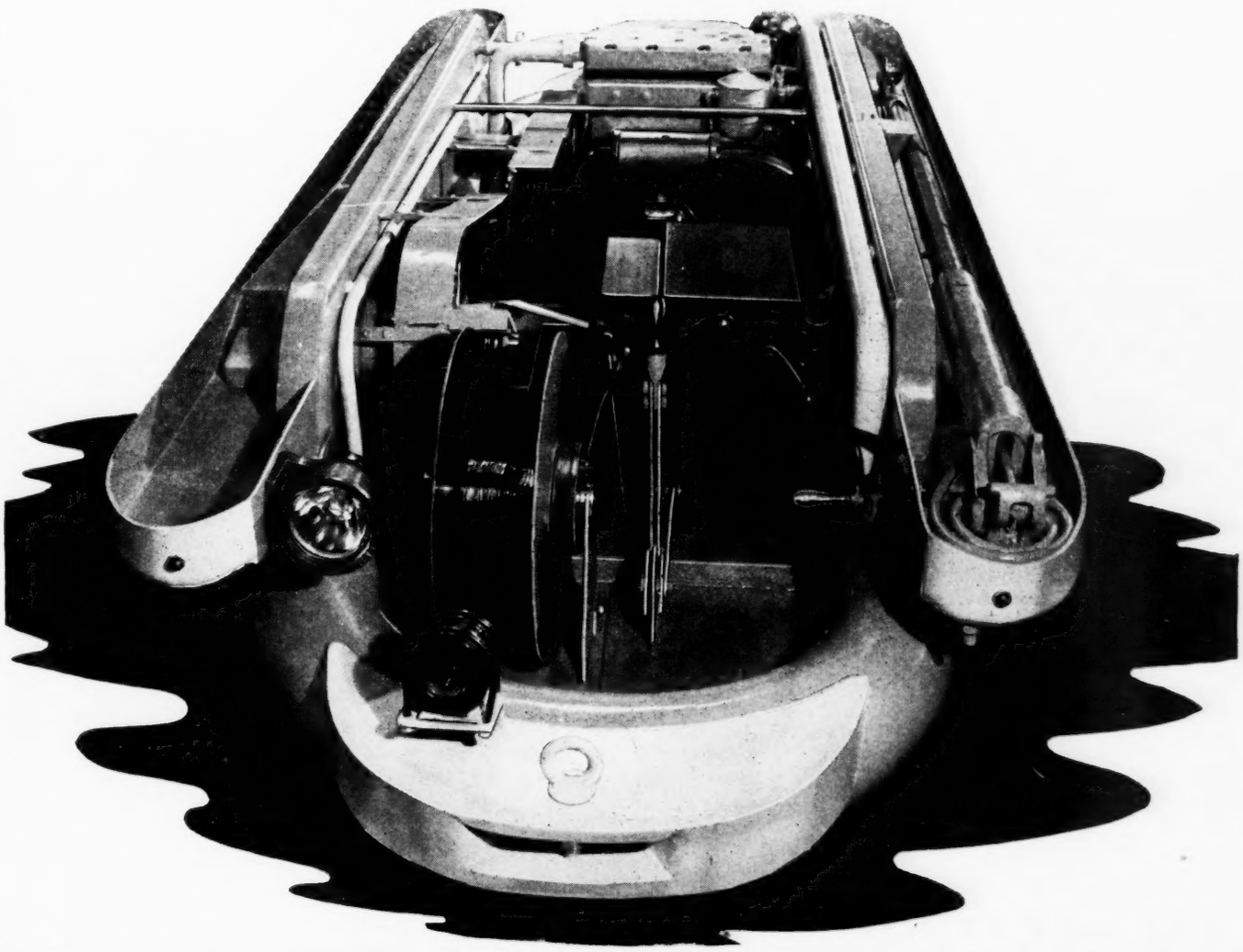
In addition to its primary function of heavy duty compressed air service, it is, at the same time, a two ton locomotive and its services are unlimited. Besides its regular drilling work, the Cantrell "S-P" is used for ditch lining, leveling haulways, hauling repairs, shifting pumps and mining machines, chipping, riveting and blowing substations. As one mine operator put it: "It's just like having an extra locomotive in my mine".

Due to our exclusive factory rebuilt compressor exchange plan, maintenance costs for all Cantrell Compressors are extremely low. This plan permits replacement of complete compressor unit at a nominal cost when major repairs are needed.

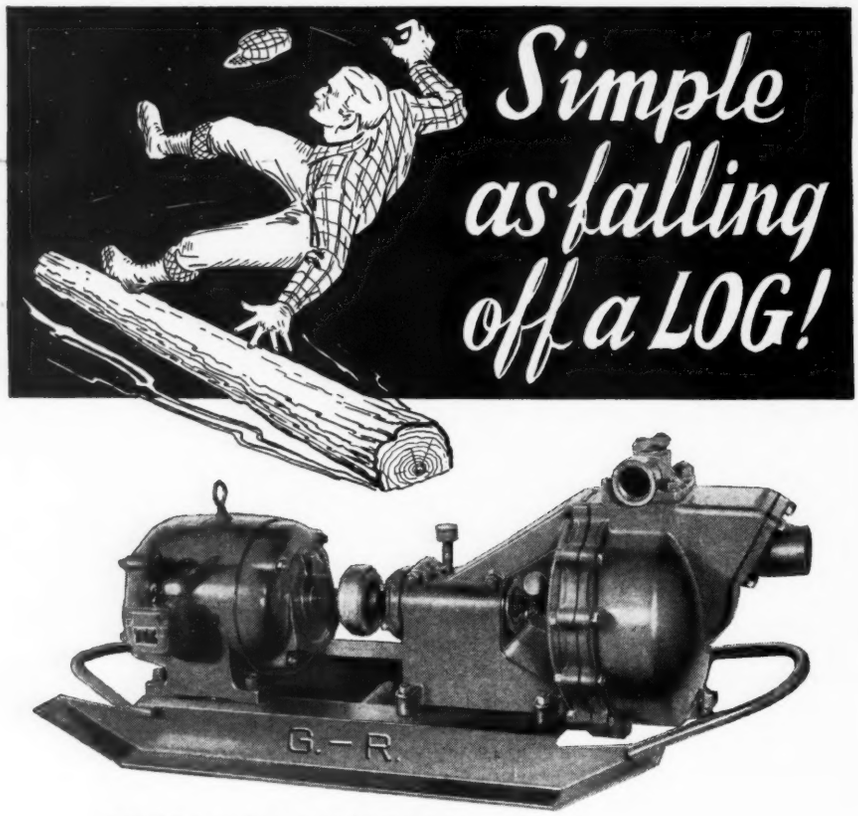


Cantrell COMPRESSORS

Photo above shows Cantrell, Type S-P Compressor with safety-top in place. Below is a detail view of compressor with safety-top removed. A simple shift of a lever changes unit from locomotive to compressor service.



IMPERIAL-CANTRELL MFG. CO., JELLICO, TENNESSEE



SIMPLE IN DESIGN!
SIMPLE TO OPERATE!
SIMPLE TO MAINTAIN!

The over-all simplicity of design in Gorman-Rupp centrifugal pumps is the best insurance for the mine operator against costly stoppages or maintenance. Moving parts in any machine produce wear. There are only two such parts in a Gorman-Rupp pump -- a heavy shaft rotating on anti-friction bearings and an impeller. There are no reduction gears, no sensitive valves. Such wear as occurs takes place in the wear plate and impeller which can be replaced quickly with common tools.

You can operate Gorman-Rupp pumps for months at a time without a rest. They will handle any solids that will pass the intake strainer without clogging or damaging the pump mechanism. These pumps are completely self-priming. Prime is never lost and no adjustment is required between prime and run. Pump may be operated automatically by remote or float control or by time switches.

These husky durable pumps bring to you a reliable, trouble free service so necessary in mine operations.

Gorman-Rupp pumps are made in various sizes with capacities from 4,500 to 15,000 gallons per hour and heads up to 125 feet.

For further information write for a copy of our special mine pump bulletin No. 301-46 or contact your nearest distributor.

THE GORMAN-RUPP COMPANY
306 BOWMAN STREET, MANSFIELD, OHIO

Distributed by: Guyan Machinery Co., Logan, W. Va. — Weinman Pump & Supply Co., Pittsburgh, Pa. — McComb Supply Co., Harlan, Ky. — Bittenbender Co., Scranton, Pa. — Industrial Supply Co., Terre Haute, Ind. — Hoe Supply Co., Christopher, Ill. — Central Supply Co., Greenville, Ky. — Ebbert & Kirkman Co., Inc., Birmingham, Ala. — Henszey Co., Watertown, Wisc. — Union Supply Co., Denver, Colo.

Mines to establish an anthracite laboratory to investigate the mining, preparation and utilization of anthracite and to assist the industry in overcoming certain difficulties in producing and marketing. The war interrupted the plans and the project was held in abeyance until the summer of 1946, when funds were appropriated to establish the laboratory. The site survey was started by the Bureau of Mines in July, 1946, when Director R. R. Sayers sent questionnaires to many interested parties.

When the laboratory is established at Hazleton, the Bureau of Mines will carry on an extensive program of scientific research designed to stimulate more efficient mining, preparation and utilization of anthracite. The engineers and research workers will aid in developing more uses for anthracite, in promoting health, safety and sanitation in mining operations and in solving special problems like the flooding of mines. Fundamental information essential for the industry will be obtained, and the work is expected to strengthen and supplement the research now being carried on by the industry, the State and other organizations.

•

Big Inch Bids Again Sought

Bids for the purchase of the Big and Little Inch pipelines were again last month being accepted by the War Assets Administration, with the lines being offered for immediate sale to the highest bidder for the transmission of either petroleum or natural gas or a combination of both. The deadline for the reception of offers was Feb. 8, with the proposals being publicly opened Feb. 10.

All offers received by WAA last summer were rejected on the basis that none of them guaranteed the government a fair price. Apparent objection to the sale of the lines for the transmission of natural gas on the part of the War Department and other government agencies evaporated last fall following the coal shortage created by the Nov. 20 bituminous work stoppage.

Plans for a new 105-mile natural-gas pipeline from Denver to Cheyenne, Wyo., were recently announced by the Colorado-Wyoming Gas Co. To cost in excess of $1,000,000, the new pipeline will connect near Denver with a new line bringing gas from the Hugoton field in Kansas. Actual start of construction, scheduled for April 1, awaits final approval from the FPC. Decision to use the Kansas gas, according to H. H. Lenhart, general manager, Cheyenne Light, Fuel & Power Co., followed a survey of Wyoming gas fields which showed a supply available for only 15 to 17 years. The new line, is said, will triple the gas available to Cheyenne.

•

Gas Explosion Kills 15 Miners

Fifteen miners were killed and two others injured by a gas explosion in the Top Ross vein of the Nottingham colliery, Glen Alden Coal Co., Plymouth, Pa., Jan.

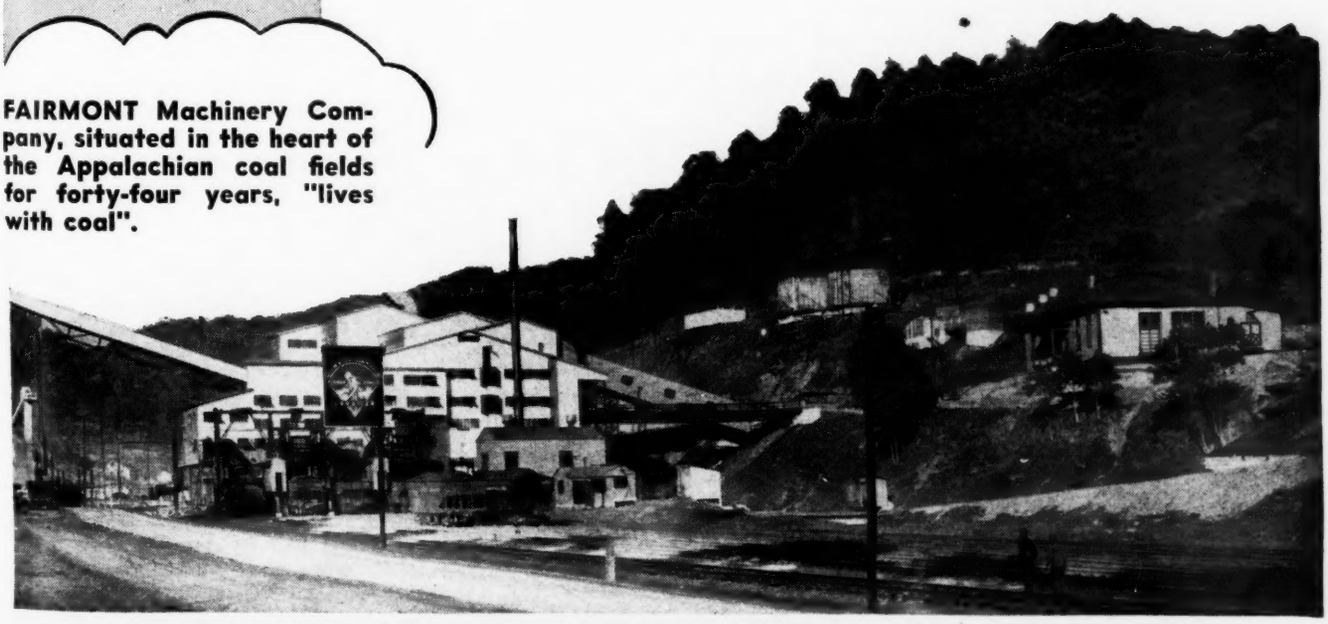
Our objective-

To make possible, through better coal,

More Profit For You!

FAIRMONT'S long, close association with you, the mine operators, on problems of coal preparation and treatment has provided us with a tremendous store of information . . . knowledge of your special needs that is being applied to create greater markets and greater market-value for your coal. And, our whole effort being concentrated on the constant improvement of coal preparation systems, you can be assured that your questions receive the kind of specialized attention they deserve, from qualified personnel. We pledge ourselves to the continuance of these efforts and to continued outstanding service in the designing and building of better preparation systems for the coal mining industry.

FAIRMONT Machinery Company, situated in the heart of the Appalachian coal fields for forty-four years, "lives with coal".



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FAIRMONT MACHINERY COMPANY

"Designers and Builders of Sand Flotation and Air and Pneumatic Separating Plants"

FAIRMONT, W. VA.

BIG

TWO-FISTED PERFORMANCE

THE WOOD SHOVEL & TOOL COMPANY
Wood's
BIG FIST
SHOVEL
NORTHERN ASH HANDLE
PIQUA, OHIO, U.S.A.

COAL SHOVELS

SMART BUYERS
SPECIFY BIG FIST SHOVELS TO GET THESE EXTRA VALUE FEATURES.

- Moly D Handle with Steel Banded Grip. Grip never loosens, checks or splits.
- Thoroughly seasoned XX Grade handles. Thoroughly sanded and waxed.
- Steel I-Beam Handle Reinforcement. Strengthens where most breaks occur.

MINERS PREFER BIG FIST SHOVELS BECAUSE

- Flat edge and wide curved flare of blade gets into and under coal.
- Fine Tool Balance lessens fatigue because shovel is easier to work with.
- Over-sized Moly D Handle is comfortable to any hand regardless of size.

THE WOOD SHOVEL AND TOOL CO., Piqua, Ohio

A National Organization Specializing Exclusively in

SHOVELS SPADES SCOOPS

15. Two other miners working in the area were uninjured.

The exact cause of the blast, which occurred approximately two hours after the start of the night shift, was not immediately determinable but company officials stated that the accident definitely resulted from an explosion of gas. The working places involved were 2,000 ft. in from the shaft, and workers in other veins on the same level were not affected. No fire followed the explosion and the mine was in full production the next day, except for the explosion area.

•

Coal-Mining Towns Portrayed by BCI

"Bituminous Coal Mining Towns," a 24-page booklet profusely illustrating the progress operators and miners have made in meeting the problems of community living, has been published by the Bituminous Coal Institute, Washington, D. C.

A factual, documentary report covering housing, sanitation, medical care, recreation and related subjects, the booklet offers abundant evidence in the form of actual pictures of the progress in good living that has been made in coal mining communities. While it does not claim that all coal mining towns are as modern and fine as those shown, it presents ample evidence that poor living conditions in the industry are the exception and not the rule.

Wide distribution of the booklet throughout the country is now being carried on by B.C.I.

•

Mines Closed In Illinois & W. Va.

Closing of the Macon County coal mine, Decatur, Ill., after 65 years of successful operation, was reported last month. Inability to secure sufficient help has made the operation unprofitable, according to Herman Gould, manager. The mine has employed up to 600 men.

The Willabet No. 10 mine of the Leckie Fire Creek Coal Co. was closed Jan. 6 when the recoverable coal became exhausted, company officials announced. About half of the mine's 75 employees will be absorbed at the company's other mine at Fireco, W. Va., four miles away, it was said, although it is expected to be worked out within the next six months or a year. The Willabet mine was opened about 1934 and mined the Beckley and Pocahontas No. 4 seams.

•

A.I.M.E. to Discuss Atomic Energy

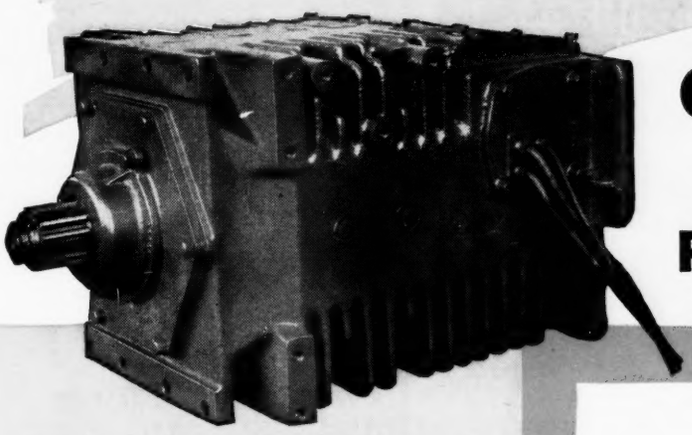
An outsanding feature of the program planned for the World Conference on Mineral Resources in connection with the official observances of the 75th anniversary of the A.I.M.E. at the Waldorf-Astoria hotel March 17-19, will be a session on "The Mineral Industry and Atomic

7 out of 10

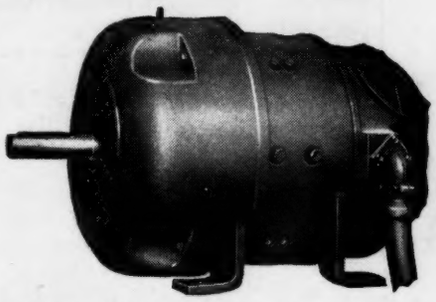
COAL LOADERS

now powered by

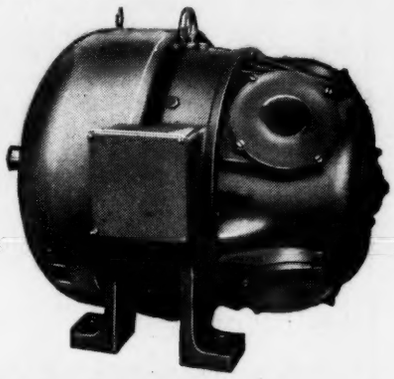
RELIANCE MOTORS



Reliance D-c. Explosion-proof Mine Motor, specially designed for loading equipment.



Reliance Fully-enclosed, Fan-cooled D-c. Mine Motor for use on permissible underground equipment.



Reliance Fully-enclosed, Fan-cooled D-c. Motor for use where permissible equipment is not required.

In the modern swing to mechanization, *outstanding* performance is making Reliance Motors the preferred source of power in more and more mines. On 7 out of 10 loaders, on conveyors, shuttle cars and preparation equipment in the tipple, these rugged, designed-for-the-job drives help keep production up—costs down.

Specify Reliance Motors on new equipment and for replacement. You will soon see how it pays!

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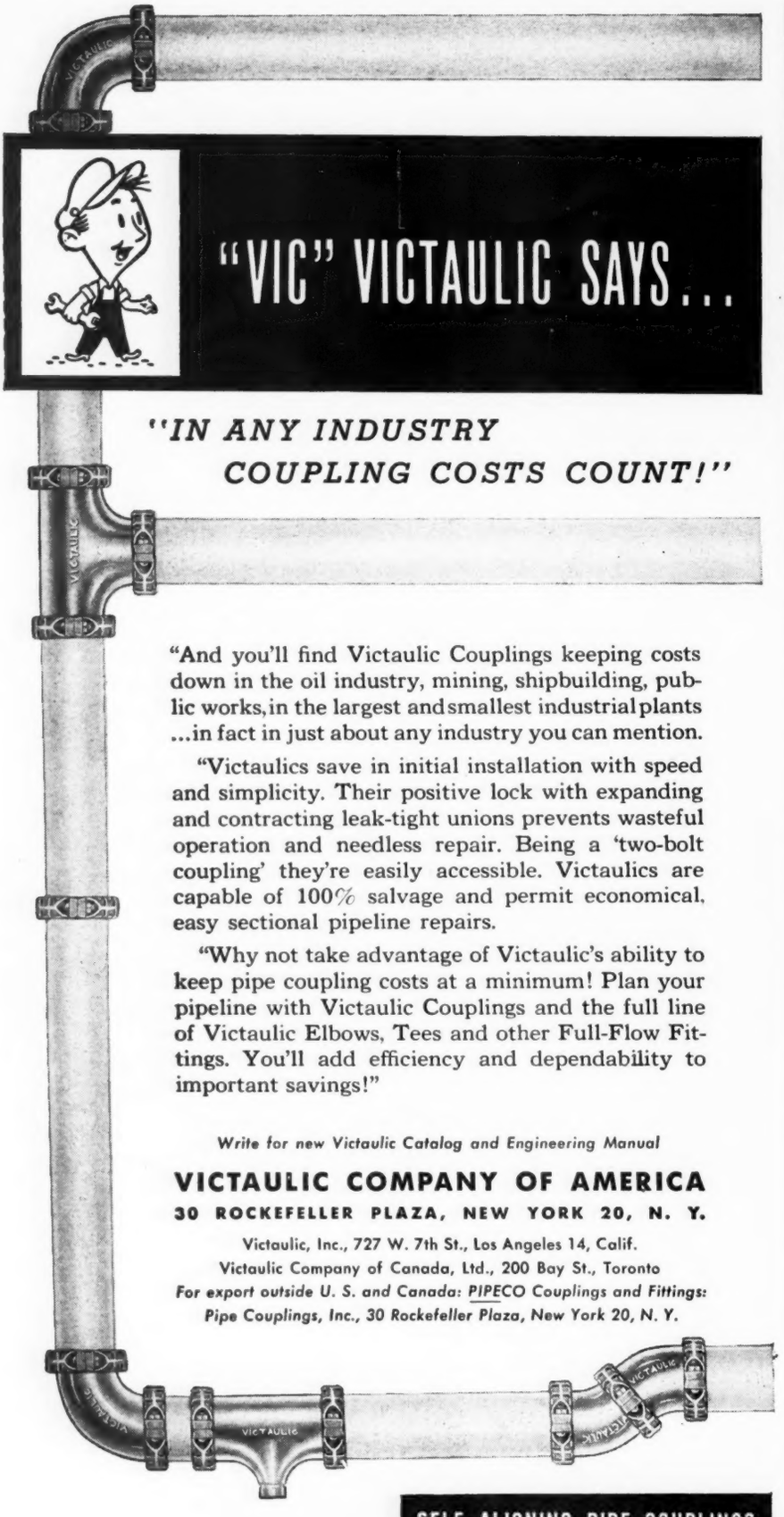
RELIANCE A-C D-C MOTORS

"Motor-Drive is More Than Power"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Energy," according to a recent announcement by Louis S. Cates, president of the Institute.

"The three-day conference," said Mr. Cates, "will cover virtually every phase of the world's situation at this time with respect to iron and steel, coal, petroleum, nonferrous metals, and most important of all, atomic energy."

Mr. Cates stated that delegates from every mineral producing country in the world are being invited to the conference, with the State Department cooperating in helping to compile the invitation list and in advising foreign engineers and metallurgists, through its representatives abroad, of the scope and importance of the meeting.

General topics to be discussed during the three-day Conference include "World Mineral Economics," "World Mineral Resources," "The Mineral Industry and Atomic Energy" and "Forecast of Mineral Technology". From three to four addresses by world authorities will be presented on each of these topics.

•

Two "Char" Plants Planned in Utah

Plans for construction of two coal-processing plants in Utah have been announced by the Utah Chemical & Carbon Co. at Salt Lake City and by a new corporation in Carbon County.

Grant Macfarlane, secretary and director of Utah Chemical, reported that plans call for an $800,000 plant to make a smokeless fuel known as "char," along with chemicals, drugs and other substances derived from coal tar. Construction of the plant, by the Pritchard Co. of Minneapolis, will start soon.

The Carbon County processing plant, which also will produce char, will be started near Wellington in the Carbon coal fields within a few weeks. It will have a capacity of 100 tons a day. L. A. Grundvig is president of the Carbon County corporation, which was formed by subscription of residents of the county.

The Utah Chemical & Carbon Co., incorporated last July, is headed by Walter M. Russell, New York, and H. W. Monahan, New York, is vice president and director.

•

Coal Companies Sell Homes

Arrangements for the sale by the Rochester & Pittsburgh Coal Co. of 1,500 miners' homes in 16 mining towns to the Kovalchik Salvage Co., Indiana, Pa., for approximately $1,000,000 was announced Jan. 2.

Under the contract, the miners can purchase the homes within one year at "prewar prices" of about $200 a room. The Kovalchik company will continue to rent the houses at current rates to those miners who do not desire to purchase them.

Heath S. Clark, president, Rochester & Pittsburgh, said that the arrangement

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LIGHT . . . .

WHERE LIGHT IS NEEDED

more brilliant
more effective
completely reliable

plus comfortable, safe head protection!

Light the way to safer production with Edison Electric Cap Lamps—sturdy, powerful, built for the most rugged mining service, furnishing high illumination better directed to the job!

Unfailingly dependable in operation, Edison Lamps enjoy top popularity in modern mining. When worn with M.S.A. Comfo Caps for all-around head safety, they supply the miner with personal protection that is continuously effective throughout every shift. *Demonstrations gladly arranged on request.*

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THIS IS A TIME FOR DECISION!

Synthetic or Natural

Every once in a while a basic decision must be made by every growing industry. The wire and cable industry must make such a decision now. Natural rubber is becoming more plentiful. Is it to resume its former important place in wire and cable insulations? Have synthetic rubber insulations made a place for themselves? How do they compare with those made with natural rubber?

We have attempted to answer these questions in a new "Report to Industry." Available data show that most wires and cables are better with synthetic rubber insulations. We are well pleased with synthetic rubber. Our experience with synthetic rubber during recent years has persuaded us that we can best serve you by using it in the future.

Every user of insulated wires and cables is interested in this subject. If you have not already received a copy of our report, we suggest that you ask for "Our Third Report to Industry on Synthetic Rubber Insulations." In it we have explained our reasons for deciding in favor of synthetic rubber and have included comparative data showing the present relative values of natural and synthetic rubber insulations.

Simplex-WIRES & CABLES

SIMPLEX WIRE & CABLE CO. 79 SIDNEY ST. CAMBRIDGE 39, MASS.

contains a number of provisions "for the protection of employees." The new owner, he said, will furnish the same services as now provided by the coal company except that electricity will be provided by local utilities as soon as arrangements can be made.

Also in Pennsylvania, the Buckeye Coal Co., Nemacolin, has been reported to have sold 430 company-owned houses to its employees. The houses are single-, double- and three-family dwellings with all modern conveniences and have been rented to employees at an average of $16.50 a month. They were built immediately after the first world war.

•

Coal Heat Group Formed in Elkhart

Leading coal merchants of Elkhart, Ind., representing 82 percent of the retail coal tonnage of that city, have organized Coal Heating Service of Elkhart, Inc., the third group to participate actively in the program of merchandising and service which forms the basis of the Coal Heating Service plan, J. Nelson Stuart, manager, Coal Heating Service division, National Coal Association, recently announced.

Heading the board of directors of Coal Heating Service of Elkhart, Inc., as its first president, is E. L. "Vic" Danielson, Krau Coal Co., who is also president of the Indiana Fuel Merchants Association. Other directors include: Harman F. Stultz, City Coal Co., vice president; Howard C. Ulery, Banner Coal Co., treasurer; David M. Russell, "Russell The Coal Man," and Paul K. Welter, Welter Coal Co. The secretary is Roy F. Jones, who also is secretary of the Elkhart Credit Bureau.

As the third group to adopt the Coal Heating Service plan of increasing consumer acceptance of coal, Coal Heating Service of Elkhart, Inc., follows Coal Heating Service of Detroit and Coal Heating Service of St. Joseph County (Indiana), comprising South Bend, Mishawaka and surrounding rural communities. The three groups comprise 246 coal merchants selling approximately 3,429,000 tons of coal at retail annually. A number of other groups in the process of organization will greatly increase these totals in the near future, Mr. Stuart said.

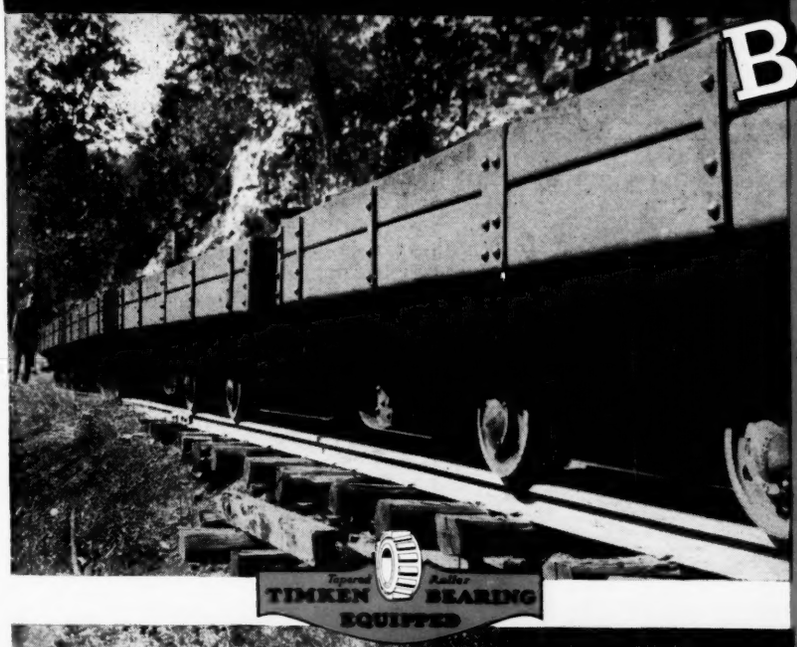
•

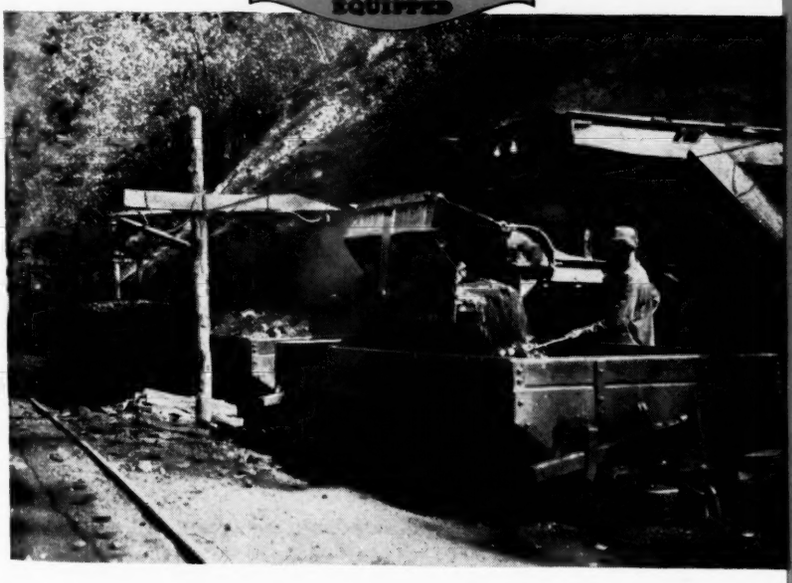
Correction

In the article, "Modern Methods Put Piney Fork in High Efficiency Class," *Coal Age*, November, 1946, in discussing the refuse-disposal system the following statement appeared on p. 88: "Cost of disposal of 86,000 tons monthly, including labor and power, is $1,800."

While this statement is correct, it is somewhat misleading in that this cost of $0.021 per ton of refuse handled is not the total cost as it includes only operating labor for the unit. If all costs of operating labor and supplies, power, maintenance labor and supplies and track labor and supplies are included, the total cost of refuse disposal is $0.0518 per ton, or $4,455 monthly for 86,000 tons.

Anchor Coal puts new 5 ton capacity cars in service on TIMKEN BEARINGS





These big drop-bottom cars represent part of the Anchor Coal Company's mechanization program at their No. 5 Powellton mine, Whitesville, W. Va.

They were built by American Car and Foundry Company and are equipped with Timken Tapered Roller Bearings on all axles.

Timken Bearing Equipped mine cars form the backbone of mechanized efficiency and economy in more than a thousand mines.

No program of mechanization that does not include them can be expected to achieve maximum results, for the only coal that pays is *coal at the tipple.* The Timken Roller Bearing Company, Canton 6, Ohio.

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TRADE MARK REG. U. S. PAT. OFF.
TAPERED ROLLER BEARINGS

To Mine Equipment Manufacturers:
Look for the trade-mark "TIMKEN" on every bearing you use.

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Removal of tramp iron from material to protect your product, your machinery, your employes—concentration of ores and minerals for improved values—purification of material—moving material safely, quickly and economically with lifting magnets—control of machinery with magnetic clutches and brakes—these are some of the many profitable uses for Stearns Magnetic equipment that will reduce your production costs.

Consult Stearns Magnetic engineering and laboratory facilities for advice on how our equipment can help you.

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Lehigh Group Studies Anthracite Sizing

A scientific study aimed at increasing the efficiency of reciprocating-type screens in the screening of Nos. 4 and 5 buckwheat coal was revealed recently in an announcement by the Lehigh University Institute of Research of a project sponsored jointly by the Wilmot Engineering Co., Hazleton, Pa., and Laubenstein Mfg. Co., Ashland, Pa. The project also seeks to determine the effectiveness of the screens when used for de-watering these sizes.

The work, begun last July, is conducted on a scale model of the reciprocating-type screen provided by Wilmot and utilizes sizing and de-watering screens produced by the Laubenstein company for the study. Plates used in the experiments have holes as small as 1/32-in. The main purpose of the project, according to Mr. Laubenstein "is to help the anthracite region in developing new markets and thus assure higher productivity for this region."

•

W. Va. Court Upholds Strip Blast Decision

The West Virginia Supreme Court last month, in declining to docket the certified case for review, in effect upheld the Monongalia circuit court on its ruling that unless negligence is shown, a strip-mine operator is not liable for secondary blasting damage to the adjoining property of others.

In a $12,000 damage suit brought against Carlo Bianchi & Co., Inc., Mrs. Helen W. Hugart had contended that her home 1,500 ft. from the blasting operations was damaged by the blast shocks transmitted through the earth and that the blasting was continued even after she had notified the company of the damage being caused.

•

Electrical Group Formed in Indiana

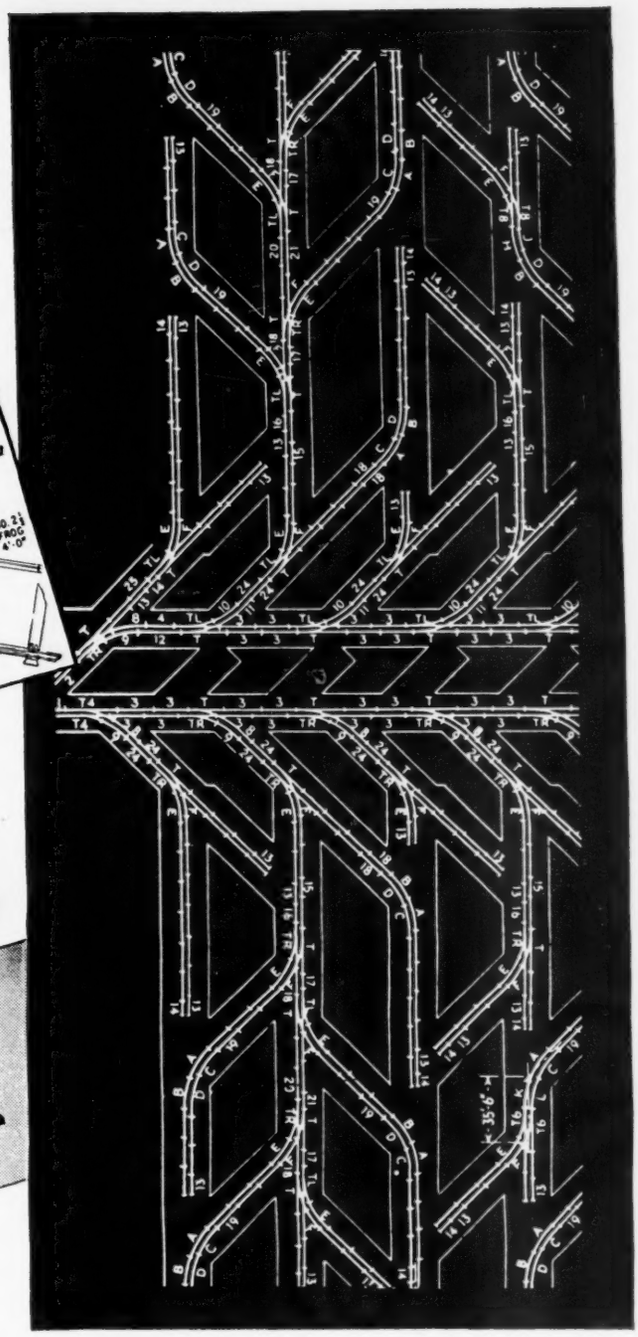
Organization of the Indiana Mining Electrical Society, with offices at 417 Merchants Bank Bldg., Indianapolis, was reported recently, following a meeting Dec. 4 in Vincennes to discuss and formulate the objectives and activities of the group.

The society plans to meet for dinner and an evening meeting in Vincennes, Sullivan and Terre Haute, as determined by the officers, on the third Thursday of each month from October through May, to exchange ideas, hear speakers of interest and carry on discussions of electrical subjects. Membership is limited by invitation and both operating men and suppliers are being invited to join. Dues are $2 yearly.

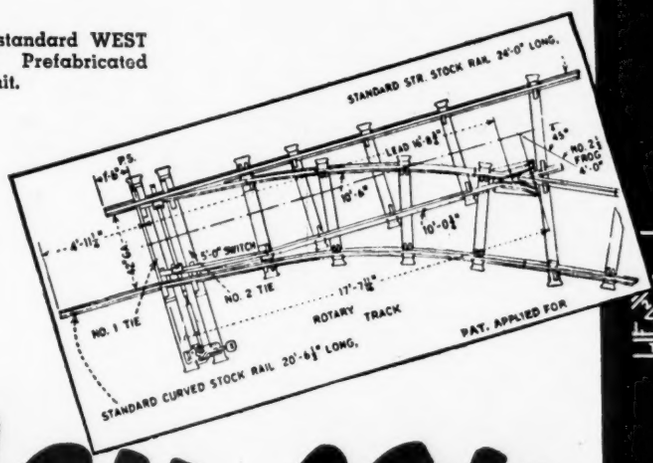
Officers elected at the initial meeting are: Lester Briscoe, electrical engineer, Ayrshire Collieries Corp., president; Her-

At right, a mine layout such as can be planned by you on paper, produced in standard sections by WEST VIRGINIA and delivered to you ready to be laid. The only track tools you'll need are a wrench, a hammer and a blueprint!

In an actual installation three men moved WEST VIRGINIA Prefabricated Track from 1½ rooms and delivered it to a new location in one shift—proof that this method saves time and helps you produce more coal per shift.



Below, a standard WEST VIRGINIA Prefabricated Turnout Unit.



You can lay WEST VIRGINIA PREFABRICATED track faster

Send us a rough drawing, showing what you want in your panel layout. We'll be glad to demonstrate the advantages of using WEST VIRGINIA Prefabricated Track.

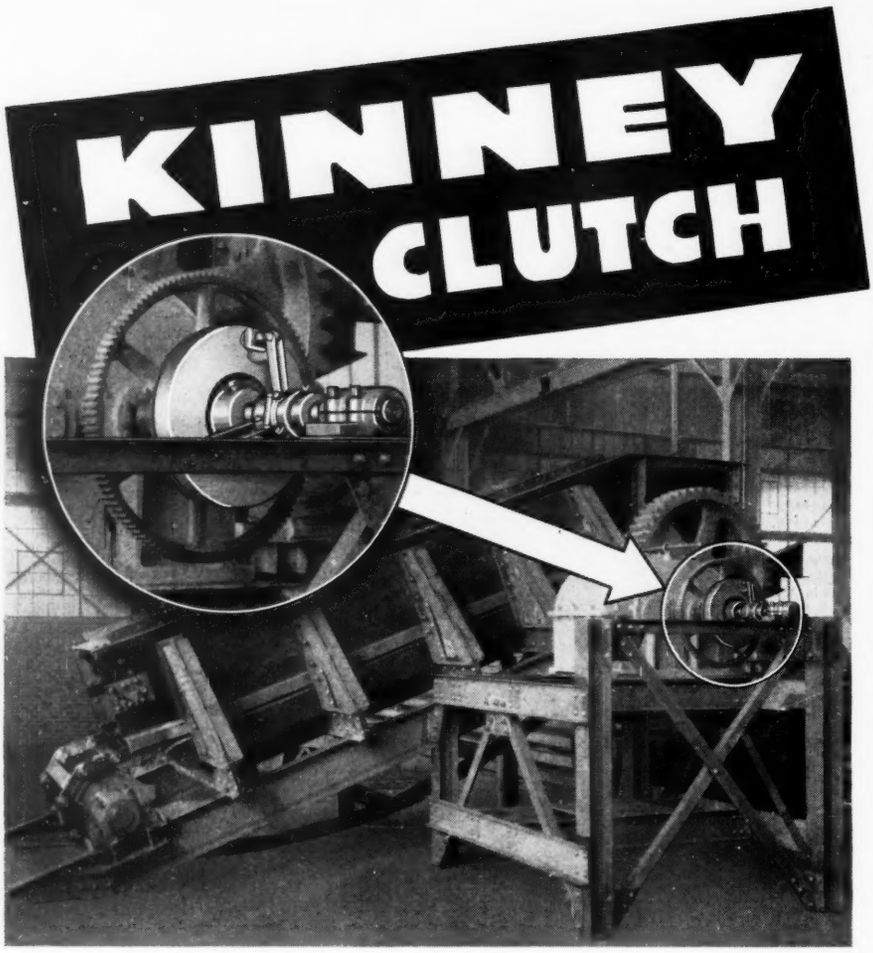
Help Yourself

By assisting in any way possible the movement of surplus billets, rerolling rails and scrap to the mills. All are greatly needed to continue the manufacture of steel items that you need.

WEST VIRGINIA STEEL & MFG. COMPANY

Formerly The West Virginia Rail Company

HUNTINGTON WEST VIRGINIA



. . . Where Stamina and Operating Economy Count

Products are known by the company they keep . . . the Kinney Interchange Clutch driving this Jeffrey Heavy Duty Feeder matches the rugged construction and efficient design of the entire machine. Thanks to the Kinney Clutch, the motor comes up to speed without load and it is possible to use a motor just large enough to run the equipment, with real economy in operating costs. The feeder starts smoothly and positively, whether loaded or not, and may be instantly stopped for safety and convenience.

The Kinney Interchange Clutch is extremely simple and trouble-free, and is easily adjusted by any mechanic, without special tools. Power is transmitted directly through flat discs and not through bolts or engaging mechanism. For easy installation on line shafting the clutch can be furnished in split construction. Capacities from 2 to 40 H.P. per 100 R.P.M.—speeds up to 800 R.P.M.

Write for information.

KINNEY MANUFACTURING CO.

3525 Washington St., Boston 30, Mass.

NEW YORK CHICAGO PHILADELPHIA LOS ANGELES SAN FRANCISCO

We also manufacture Vacuum Pumps, Liquid Pumps and Bituminous Distributors.

win Banholzer, electrical engineer, Knox Consolidated Coal Co., vice president; and John L. Marsh, The Okonite Co. Others signing the announcement were: Rus Alpine, chief electrician, Enos Coal Corp.; Joe Anstead, electrical engineer, Linton-Summit Coal Co.; F. J. Gallagher, electrical engineer, U. S. Bureau of Mines; Harold Lowry, chief engineer, Snow Hill Coal Corp.; and Charles Osborne, chief electrician, Sunlight Coal Co.

•

New Roof Tester Developed at Lehigh

The traditional "miner's bar," used to tap mine roofs to test their strength, may soon give way to a new electronic tester developed by the Lehigh University Institute of Research.

Using the theory that sound waves travel more readily through solid structures, the Lehigh scientists perfected a portable geophone operating with a constant blow hammer. Energy indicated by the device measures the tightness or looseness of the roof being tested.

Warning that the new instrument is not a panacea for detecting every hazardous roof, the scientists said the geophone can be employed to make periodic tests of shifting coal structures and thereby warn of impending danger.

The geophone was developed by Dr. Robert T. Gallagher, of Lehigh, and Dr. Cornelius G. Brennecke, now head of the department of electrical engineering at North Carolina State College. The equipment was first tested by the Lehigh Valley Coal Co., Wilkes-Barre, and subjected to field trial throughout the Pennsylvania bituminous and anthracite fields.

•

Films to Supplement Textbook Study

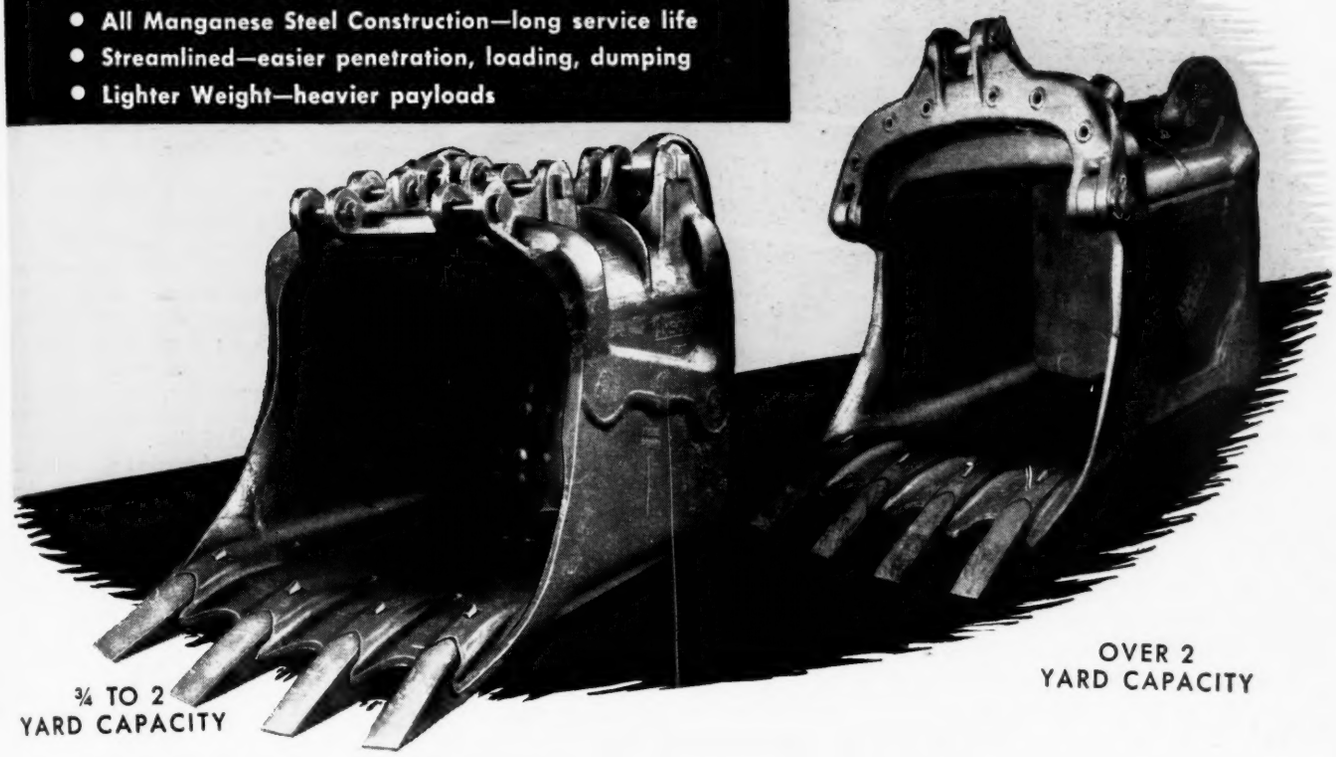
As a new venture in education, designed to forge a closer link between textbooks and films in the classroom, students and teachers of technical drawing will soon be able to use specially prepared films to supplement and amplify two leading textbooks on the subject, under a new program announced by the McGraw-Hill Book Co., Inc. Marking its entry into the educational film field, the company has started production of two series of McGraw-Hill Text-Films on the principles and techniques of mechanical and engineering drawing, each consisting of seven 16-mm. sound motion pictures and a like number of coordinated silent filmstrips, to be ready for distribution this Spring.

One series of Text-Films will correlate with French's *Engineering Drawing*, a textbook widely used for three decades in colleges and technical institutes. The other series of Text-Films will correlate with the high school text, French and Svensen's *Mechanical Drawing*. Instructors' manual will also be provided, with suggestions on making effective, integrated use of these teaching materials.

Each motion picture in each series will be accompanied by a coordinated silent

"PLUG-WELDING" MAKES THIS A BETTER DIPPER

- Plug Welded—improved design
- All Manganese Steel Construction—long service life
- Streamlined—easier penetration, loading, dumping
- Lighter Weight—heavier payloads



¾ TO 2 YARD CAPACITY

OVER 2 YARD CAPACITY

AMSCO DIPPER DESIGN PERMITS STRONGER CONSTRUCTION

Patented inter-locking design of Amsco Plug-Welded, All-Manganese Steel Dippers provides for stress-resistant welds . . . eliminates jutting shoulders that offer resistance to penetration, loading, and dumping.

Plugs in one casting fit into sockets in overlapping casting—see Figure 1. Overlapping portions are rabbetted for interengagement—see Figure 2. In both cases groove is formed for receiving weld deposit.

Additional features of Amsco Plug-Welded Dippers include: clean cutting teeth—rigidly locked in place, easily replaced; correctly contoured lip—shaped for easy penetration, full loading; flared body—tapers out slightly to door for positive, complete discharge of material.

MADE OF "THE TOUGHEST STEEL KNOWN"

The use of manganese steel throughout, plus this new all-welded design, assures the maximum in durability for a light-weight dipper.

Impact that fractures other metals work-hardens the surface of manganese steel without affecting toughness of the body metal. The surface of "the toughest steel known" takes on a "plow-share" polish that resists abrasion and assures smoother penetration and clean dumping.

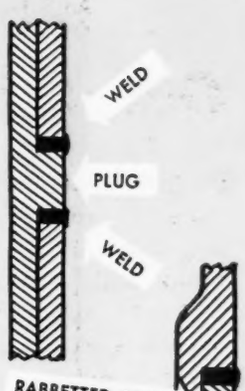


Figure 1—Cross-section showing plug welded construction.

Figure 2—Cross-section showing rabbetted overlap.

AMERICAN Brake Shoe COMPANY

AMERICAN MANGANESE STEEL DIVISION
CHICAGO HEIGHTS, ILL.

Foundries at Chicago Heights, Ill., New Castle, Del., Denver, Colo., Oakland, Calif., Los Angeles, Calif., St. Louis, Mo.
Offices in principal cities. In Canada: Joliette Steel Limited, Joliette, Que.

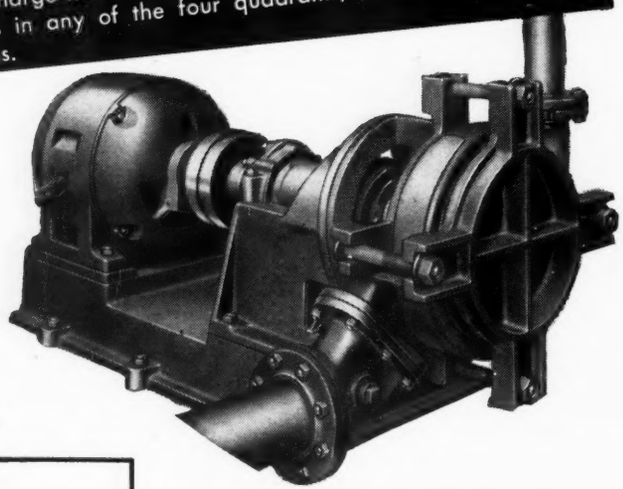
Only the NEW TYPE "R" MORRIS SLURRY PUMP has these 4 FEATURES!

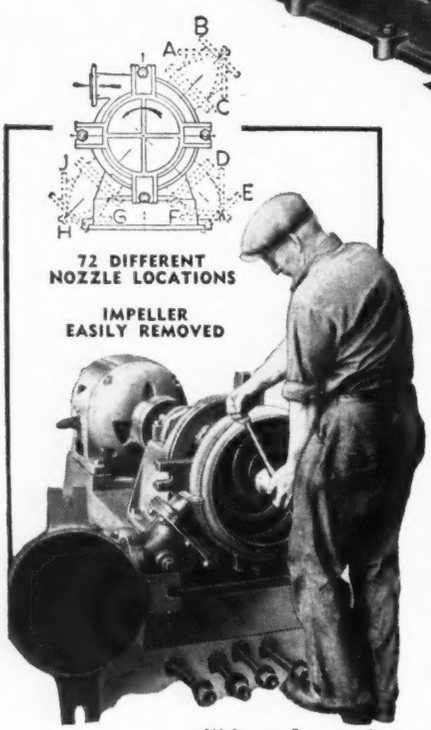
1. The gland is under suction pressure only. This feature practically eliminates packing troubles.

2. For dismantling, you need remove only four bolts. The Type "R" Morris has no internal studs or bolts . . . no troublesome fits or joints.

3. You can remove the impeller and liner without disturbing piping.

4. Shell interchangeable for right or left hand rotation. Suction and discharge nozzles can be rotated around axis of pump to positions in any of the four quadrants, a total of 72 combinations.





And They Add Up to These EXCLUSIVE ADVANTAGES

- EASY TO INSTALL!
- EASY TO DISMANTLE!
- EASY TO MAINTAIN!

The New Type "R" Morris Pump—the most advanced design in the pump field—is specifically engineered to handle ore concentrates . . . tailings, slag and residue from filters and classifiers. Operates on all types of caustic or acid mixtures containing abrasives or solids.

Write us for specification and operation data on pumps best suited to your particular needs. No charge or obligation.

MORRIS MACHINE WORKS, Baldwinsville, N. Y.
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MORRIS **CENTRIFUGAL PUMPS**

filmstrip, or slide film as it is sometimes called. However, the motion pictures and filmstrips are each designed to be functionally different. The motion pictures will make extensive use of animated drawing and animated photography of specially made models, all designed to help the student to think in three dimensions and to build up clear mental images of projected shapes and objects. The general teaching pattern employed in these films is to explain theory in detail, then to lead the student through the necessary steps in constructing the drawings.

Each filmstrip is being planned as a follow-up to the corresponding motion picture. Each will present additional factual and diagrammatic material, and practical problems to be solved by students. Also the film-strip will ask questions, and will re-emphasize key points in both textbook and motion picture. This type of film is valuable for class review, for oral discussion or examination, for lecture illustration or for study by small groups or even by individualals out of class.

These two series of motion pictures and filmstrips are among the first of a number of McGraw-Hill Text-Films being produced to supplement many of the widely used McGraw-Hill textbooks. Other series will be completed soon to accompany texts on Student Teacher Training, for normal schools, teachers' colleges, and "in-service" teacher training programs; and Healthful Living, for college freshman hygiene courses and adult education groups.

•

Overseas Coal Notes

LONDON—In its first week of nationalization the British coal industry produced 238,000 tons more than the corresponding week in 1946, with 3,400 less employees, according to an announcement by the Ministry of Fuel and Power. For the week ending Jan. 7, the output totalled 3,790,000 tons.

In another step to balance its coal consumption with supply, a six-week conservation program calling for an average 50-percent cut in industrial coal allocations was put in effect Jan. 20 by the Ministry of Fuel and Power. Officials stated, however, that the new order did not mean a reduction in the amount of coal actually delivered since deliveries have been 40 to 50 percent behind allocations for some time. Utilities, railroads and domestic users were to receive their full allocations and the cut was to be adjusted for essential industries, with the iron and steel industry, for example, being cut only 25 percent.

EDINBURGH, SCOTLAND (McGraw-Hill World News)—The Logan slab cutter-loader for coal mining has now been tested under working conditions and has achieved a cut of 120 yd. in 1¾ hr., according to Dr. William Reid, Scottish Production Officer for the National Coal Board. Dr. Reid described the new machine's performance as exceptional and indicated a belief that the National Coal Board will buy a considerable number.

The Logan is an entirely Scottish ma-

FASTER LOADING
BETTER CLEAN-UP

with greater flexibility...

The CLARKSON

TYPE 24 BB *Redbird*

THE CLARKSON TYPE 24 BB UNIVERSAL LOADER . . . THE LOWEST LOADING MACHINE ON WHEELS

Rapid, low cost digging and loading—in minimum headroom. Powerful, compact digging head for the tight spots. . . . . One-man central control—left or right. . . . . Vertical or horizontal adjustment and exceptional flexibility.

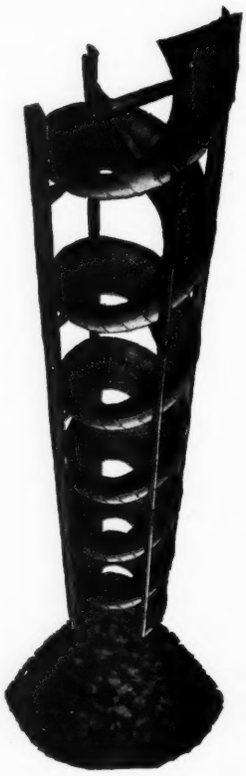
The CLARKSON MANUFACTURING CO.
Nashville Illinois

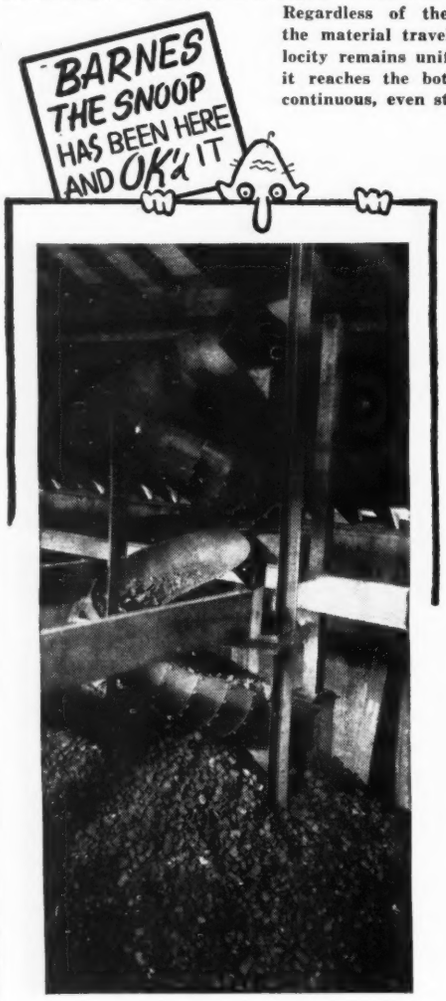
Complete details on the exclusive Clarkson features will be sent at your request.

GENTLY thats the ANSWER!

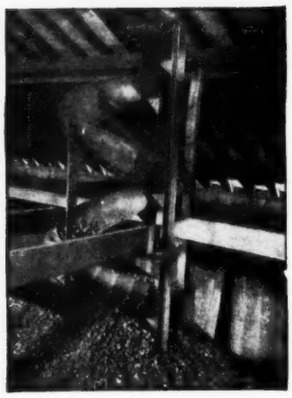
HOLMES LOWERING SPIRALS. The advantage of Holmes' spiral over previous chutes of this nature lies in the design of the carrying surface, which is formed much as the bowl of a race-track, having no retaining wall on the inside edge. Elimination of this inside edge allows the material to slide gently onto the peak of the pile without droppage. By the same token, the peak of the pile may be carried around the interior of the bin in such a manner that the material is deposited in overlapping layers, where the problem of segregation is present.

Design is such that the lowering speed of the material is automatically retarded when it begins to exceed a safe limit. Regardless of the distance the material travels, its velocity remains uniform; and it reaches the bottom in a continuous, even stream.





Coal Bunker Storage



Holmes Lowering Spirals

Gently deposit fragile materials on the peak of the pile in bulk storage bins, eliminating vertical drop.

ROBERT HOLMES AND BROS.

BINS - GATES - LOWERING SPIRALS - DUST-O-LATORS - SHAKING GATES

DANVILLE, ILLINOIS

chine, made in Dundee from plans which were begun in 1935 but which have been delayed for various reasons since. The first test, held in the Lumphinnans No. 11, has shown it to satisfy the demand for an efficient cutter-loader.

SHANGHAI (McGraw-Hill World News) —Power plants, machinery and machine-shop equipment worth $5,763,563 have been sold by the Chinese National Relief and Rehabilitation Administration to the National Resources Commission for the rehabilitation of ten coal mines. Four 500-kw., four 1,000-kw. and one 2,000-kw. generators valued at $1,049,724 and $4,547,839 of mine equipment are included in the contract, which calls for a 30-percent down payment within five months and the remainder to be paid off in 12 quarterly installments within three years.

Two small portable machine shops valued at $83,000 each were sold for use at NRC coal mines at Yeelo, Honan and Hsiang Kiang, Hunan. The remainder of the equipment will go to mines, designated by a combined screening board of UNRRA, CNRRA, NRC and Ministry of Economic Affairs personnel, as follows: Hsiang Kiang, Hunan; Chiling, Hunan; Petzeling, Kwangtung; Kaokong, Kiangsi; Tatung, Shansi; Yeelo, Honan; Tzehsien, Hopeh; Chinghsing, Hopeh; Chung Hsiang, Hunan; Mentoukow, Hopeh.

AUSTRALIA (McGraw-Hill World News) —The Council for Scientific and Industrial Research has been asked by the Commonwealth Government to investigate dust in coal mines and has established a Coal Dust Research Advisory Committee.

•

Personal Notes

Joseph T. Berta, formerly sales manager, Philadelphia & Reading Coal & Iron Co., has been elected president of the Pennsylvania Coal & Coke Corp., New York, succeeding **H. Lionel Kringle,** retired.

E. R. Cooper, general superintendent, Vesta-Shannopin coal division, Jones & Laughlin Steel Corp., has been named manager of coal mines for the company.

W. E. Hess, formerly assistant general superintendent of the division, has been appointed general superintendent of coal mines, and **H. K. Griffith,** previously assistant to the general superintendent of the division, has become assistant to the manager of coal mines.

Richard T. Todhunter Jr., superintendent of mines, Barnes & Tucker Co., Barnesboro, Pa., has been named general manager. **George Dunchuck** has been promoted from mine foreman of Mine No. 15 to superintendent, and has been succeeded by **Henry C. Caldwell,** formerly mining engineer.

F. L. Anderson, associated with the Peabody Coal Co. for more than 20 years and superintendent of Mine No. 47, Harco, Ill., has been named division superintendent of the company's Southern Illinois Division, which includes Mines Nos. 14,

PROTECTION

WHERE NEEDED

H-722 . . . Men's Russet Glove, Lace-to-Toe Blucher. Composition Cord sole, rubber heel. Widths C-D-E, sizes to 13.

..Insure Workers Feet In Sure Protection with HY-TEST Safety Shoes

Each worker is his own goalie when the puck of fate, ACCIDENT, heads his way. And it's protection well placed when he's wearing Hy-Test Safety Shoes. The built-in *Anchor-Flange** Steel Box Toe stops accidents in their tracks...prevents many painful, costly injuries. All leather in vital parts, Hy-Test Safety Shoes wear longer. They're more comfortable... keep feet feeling fresher while keeping toes safer. Sizes are 5 to 15 in widths AA to EEE.

HY-TEST SAFETY SHOES

*ANCHOR FLANGE STEEL BOX TOE

This flange adds extra strength to the steel arch's sidewall. Anchored between insole and outsole, it also serves to resist shifting, tilting, and cutting through outsole under impact.

HY-TEST Safety Shoes

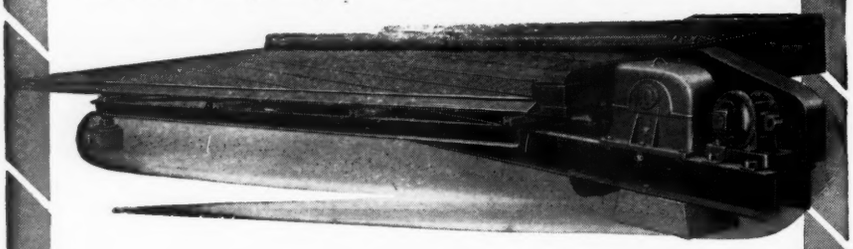
THE WORLD'S LARGEST SELLING SAFETY SHOE

EST DIVISION • INTERNATIONAL SHOE COMPANY • ST. LOUIS 3, MISSOURI • EASTERN OFFICE • MANCHESTER, N. H.

SuperDuty

Coal Washing Tables

Increase Capacity Maintain High Efficiency



The phenomenal output of SuperDuty tables is achieved, primarily, through their diagonal deck design that places approximately 75% more working riffles in the natural path of the separative action.

Not only do these tables put capacities well beyond accepted optimums, but they also produce cleaner separations . . . higher grade coal and cleaner refuse products.

For full information, send for Bulletin 119.

CONCENCO FEED DISTRIBUTORS

The Concenco Revolving Feed Distributor is a heavily fabricated all steel machine, built in various types, with motor drive requiring less than ¾ H.P. in operation. This distributor effects perfectly a splitting of feed sluiced to its revolving tank, into any desired number of equal portions. It is especially suitable for efficiently feeding a battery of coal washing tables, giving an equal distribution of feed to each table.

THE DEISTER ★ CONCENTRATOR COMPANY

909 Glasgow Ave. • Fort Wayne, Ind., U.S.A.

CONCENCO PRODUCTS

★ *The ORIGINAL Deister Company* ★ *Inc. 1906*

18 and 47, with offices at Marion, Ill. **R. M. Griffiths,** mine manager of Mine No. 47, has been appointed to succeed Mr. Anderson as superintendent at that operation.

Tom Stark, mining engineer, Island Creek Coal Co., Holden, W. Va., has resigned, after 20 years' service with the company, to join the Cole & Crane Real Estate Trust and Dingess Run Coal Co. as chief engineer, with offices in the First Huntington National Bank Bldg., Huntington, W. Va. He succeeds **Robert F. Carson,** retired, who has held that position for more than 30 years. Mr. Carson will continue as consultant for the two firms and also as secretary-treasurer of the Dingess Run Coal Co.

Joseph Pursglove Jr., president of the Pursglove Coal Mining Co., has been elected president of the Christopher Coal Co. and Brock Inc., recently acquired by the Pittsburgh Consolidation Coal Co. **R. G. Seaburn** was elected secretary, and **S. R. Pursglove** treasurer, of the companies.

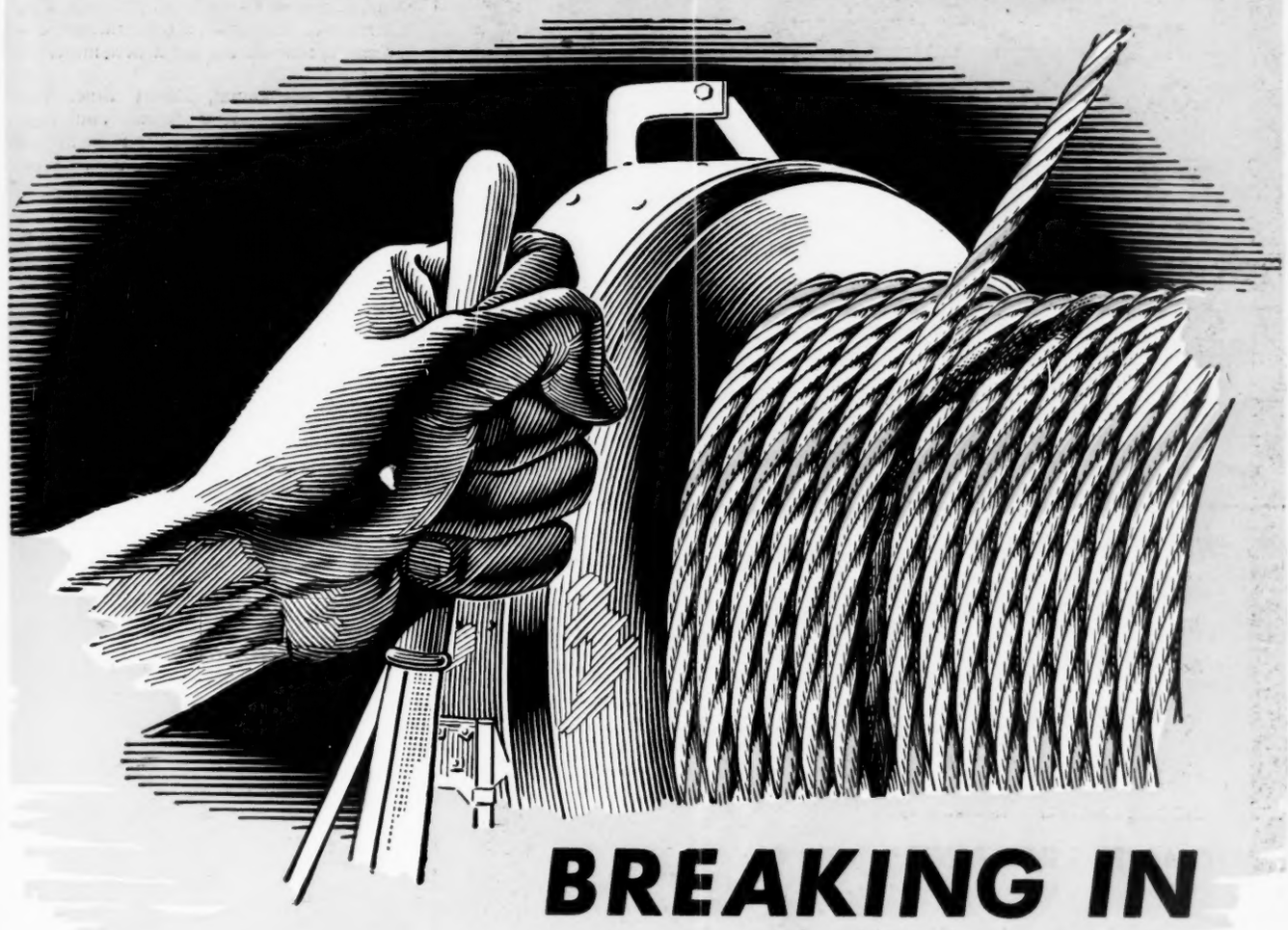
Andrew A. Millar, formerly chief inspector of mines for the Alberta government and more recently general manager, West Canadian Collieries, Ltd., Blairmore, Alberta, has been named mine manager for the Midland Coal Mining Co., Ltd., Drumheller, Alta.

Charles H. Lambur, assistant to the vice president, operations, has been named director of mining operations, Simpson Creek Collieries Co., Inc. Included in the company's operations is an 8,000-tons-per-day mine in Northern West Virginia, said to be one of the largest in the State, which has been converted from all hand loading to fully mechanized. In recent months the company's mining production has increased from 6.0 to 12.7 tons per man-day, total payroll employees, and production, including affiliates, is approximately 3,000,000 tons yearly.

Consolidation Coal Co. (W. Va.), Fairmont, W. Va., has announced several promotions among its supervisory personnel. **George W. McCaa,** superintendent, Mine No. 25, has been named superintendent, Mine No. 63, Monongah, replacing **O. F. Allen,** resigned. At Mine No. 25, Pinnickinnick, **Leon F. Wilson,** mine foreman, was appointed superintendent, succeeding Mr. McCaa. **Delmo Knight,** assistant mine foreman, has been advanced to mine foreman at Mine No. 25, and **Edison Wilson** has been made assistant mine foreman.

At Consolidation's Mine No. 32, Owings, **K. K. Kincell,** formerly section foreman, Mine No. 38, has been appointed assistant mine foreman, and he has been succeeded as section foreman at Mine No. 38 by **David Mainella. Edgar W. Heldreth** has been promoted from section foreman to mine foreman, Mine No. 98, Nora, replacing **Carson Lee Stemple,** who has been named construction foreman. **Baxter D. Wimer** and **William C. Minnear** have been appointed section foremen at Mine No. 98. At Mine No. 97, Rives-

Take the full load sooner!



BREAKING IN

the new line is a short job with *PREFORMED* YELLOW STRAND

Let's agree that "slow and easy" is a good rule for putting most equipment to work — *Preformed* Yellow Strand included. Proper adjustment between wire rope and other operating parts extends rope life.

But a prolonged slowdown for starting a new rope is expensive. And it's *unnecessary* with *Preformed* Yellow Strand, because the factory process that preshapes wires and strands is equivalent to a *preliminary break-in.*

When flexible *Preformed* Yellow Strand reaches you it is notably relieved of internal stresses. You save much of the time that would be spent trying to relax the stiffness of a corresponding unpreformed rope. After a short, gradual stepping up—to bed the strands firmly on the core—you can take the full load.

The same rope tractability aids production in other ways. *Preformed* Yellow Strand is installed quickly. It resists kinking... stays in the sheave grooves... curbs overwinding on the drum.

Specify *Preformed* Yellow Strand by name. Get all you should in wire rope performance and economy. Broderick & Bascom Rope Co., St. Louis 15, Mo. *Branches:* New York, Chicago, Houston, Portland, Seattle. *Factories:* St. Louis, Seattle, Peoria.

HAND BOOK FREE: "Wire Rope for Mining" contains useful facts, tables, pictures. Write for your copy.

BRODERICK & BASCOM
Yellow Strand
***PREFORMED* WIRE ROPE**

You cut costs . . . and save time . . .

when you use

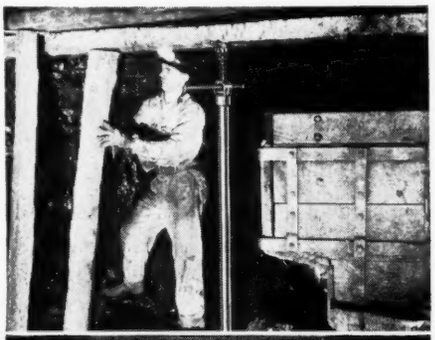
DUFF-NORTON JACKS

for your Mining Operations

There is a Duff-Norton Mining Jack for every job in and around your mine, that will help speed up your operations, cut costs, make work easier and safer. Here are a few . . .

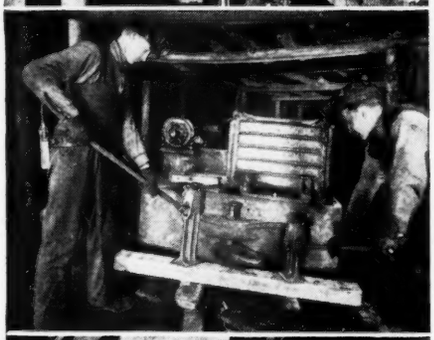
MINE ROOF AND TIMBERING JACKS

Designed for safe and fast operations, these jacks serve as sturdy supports until permanent timbering is in place, or as temporary props when setting loading or conveyor machinery. Available in heights to suit the need.



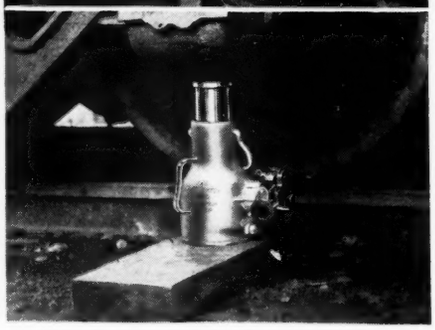
AUTOMATIC LOWERING JACKS

For rerailing mine locomotives, repairing heavy mine cars and hundreds of other uses around the mine. Available in capacities from 10 to 25 tons, for every requirement.



JOURNAL JACKS

These jacks are ideal for use in low heights and cramped areas, where high lifting capacities are required. Made in six sizes, from 10 to 50 ton capacities.



Write today for Catalog 203, which gives complete data on jacks illustrated and the many others available for the mining industry.

DUFF-NORTON JACKS

THE DUFF-NORTON MANUFACTURING CO.

PITTSBURGH, PA.

ville, **Charles H. Gaskill** has been promoted from fireboss to assistant mine foreman.

Alvis Mercer, superintendent, No. 6 mine, Elk Horn Coal Corp., Jackhorn, Ky., has resigned to become a truck-mine operator and is now developing a new mine.

G. C. Sutherland, Bonny Blue, Va., **Howard Jones,** Kettle Island, and **John H. Combs,** Allock, Ky., have been named Kentucky district mine inspectors by Gov. Simeon Willis.

Harold J. Sullivan, formerly managing director, Better Home Heating, Inc., of St. Paul and Minneapolis, has been named service manager, Coal Heating division, National Coal Association. Mr. Sullivan will assist local Coal Heating groups in developing their service programs and will supervise the planning and preparation of training programs and material for retail-coal personnel.

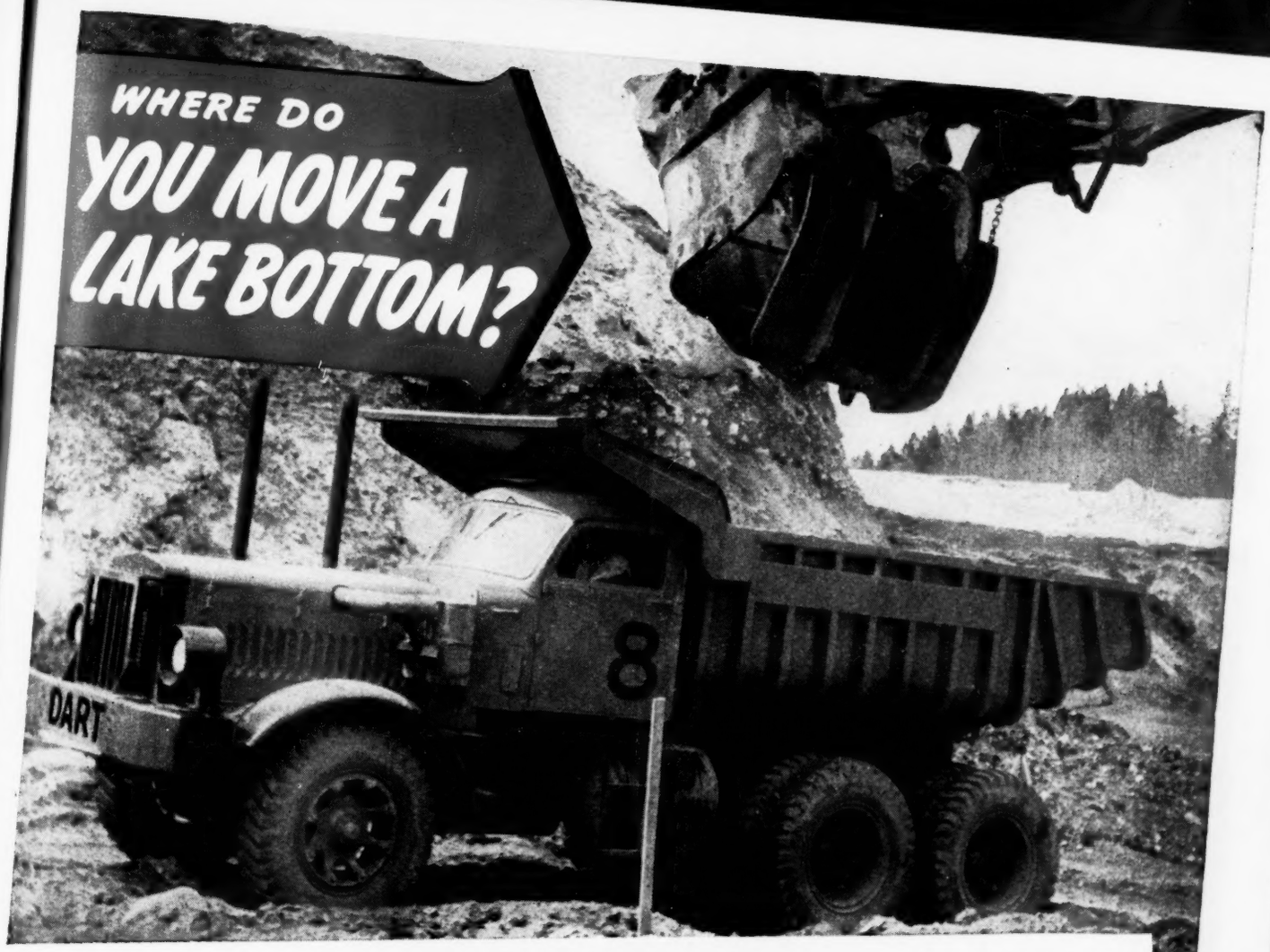
E. F. Miller, who recently resigned as general superintendent of the Federal mines of the Koppers Coal Division to move West because of ill health in his

E. F. Miller

family, has joined the American Smelting & Refining Co. in Mexico as superintendent of mines, Compania Carbonifera de Sabinas, Rosita, Coahuila, Mexico. The coal mines under Mr. Miller's supervision produce 95 percent of the coal mined in Mexico.

Frank C. Bennett has been appointed superintendent of the Crested Butte mine, Colorado Fuel & Iron Corp., Crested Butte, Colo., succeeding **Lloyd W. Ingles,** who recently resigned to go in the coal business in Fremont County. Mr. Bennett first joined Colorado Fuel & Iron in 1910 and has held many positions in mine supervision and fuel sales for the company. Prior to his present appointment, he was fuel sales district sales manager for the Southern Colorado territory.

William M. Ritter, recently returned from foreign service with the armed forces, has been promoted from division superintendent to assistant general manager, Red Jacket Coal Corp., Red Jacket, W. Va. **J. F. Maurice,** formerly preparation man-



On The MESABI IRON RANGE in Minnesota

"TONNAGE ENGINEERED" DARTS WORK RUGGED TERRAIN TO TRUCK LAKE BOTTOM UP 12° GRADES 18 TONS AT A TIME

This Dart Truck, and many more like it, is doing a big job on the Mesabi. Ore from the lake bottom is lifted by these Darts to surface hoppers some of which are well over 400-ft. above pit bottom; 8° to 12° grades are common; 36000 pounds is the normal Dart load each trip.

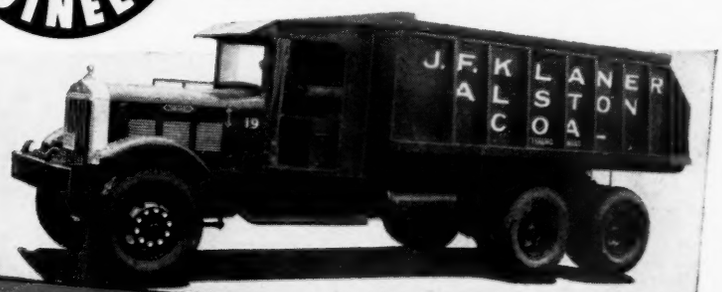
"Tonnage Engineering" by Dart fits trucks to typical jobs such as this. Power and construction are engineered to move more tonnage per investment dollar. On or off the highway—regardless of operating conditions, Dart Trucks are engineered for 5 to 80 ton payloads.

Dart TONNAGE ENGINEERED Trucks

CONSULTATION WITH OUR ENGINEERS IS INVITED

18 YEARS IN THE PITS AND STILL PAYING OFF

A pioneer—doing the same tough jobs as when it started work in 1929.



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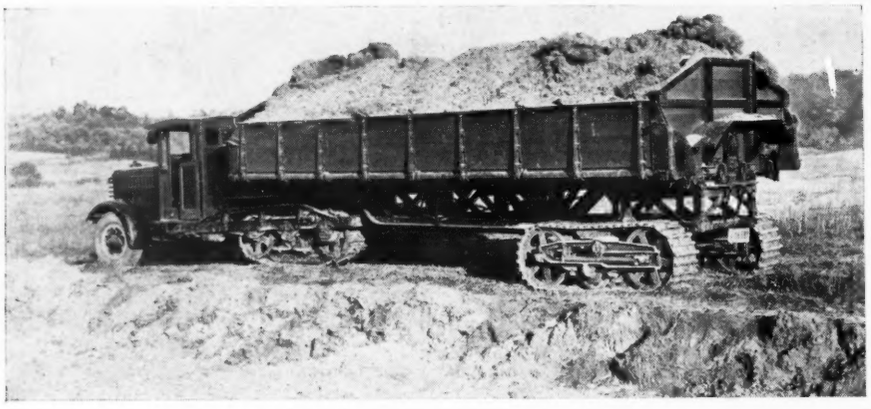
Cut disposal Costs WITH LINNS



Track semi-trailer, capacity 25 to 50 tons; two-way side tipping with dumping angle of 50°; heavy duty underbody hoists and automatic down-fold side gates.

- Because of their large capacity, LINN Haftraks handle more tons of refuse per man day with fewer trips to the dump. Built to take the roughest kind of service, they require much less time out for repairs than any other type of haulage equipment.
- Because of their traction units and ample power, LINNS carry the load—every day—regardless of footing or grade. The traction unit is flexible, not rigid, and bites in to give maximum traction over rocks, mud, ice, or burning bone that would ruin tires.
- Because they are available with capacities from 5 to 50 tons, with body styles for all types of work, or for mounting special equipment, there's a LINN for every mining need. For specifications, write to our General Sales Office, 250 West 57th Street, New York 19, N. Y.

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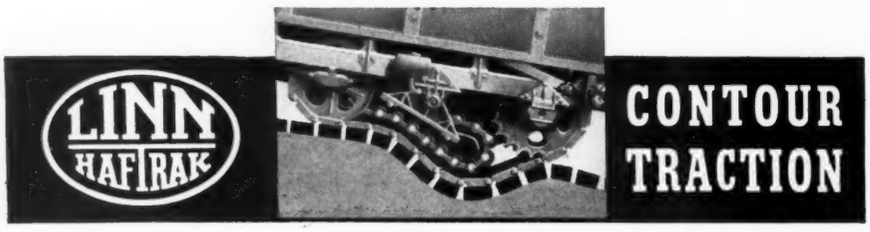
Manufacturers of Haftraks for Over 30 Years



ager, has been named chief engineer for the company. **P. M. Farquharson has been** promoted from section foreman to safety inspector.

Richard Maize, for the past six years secretary of mines of the State of Pennsylvania, has been reappointed to that position by Gov. Duff. Mr. Maize is well known throughout the industry for his contributions toward safer and more efficient mine operation. He served as vice chairman of the Anthracite Committee and has been active in the Mine Inspectors Institute, Coal Mine Institute of America and other mining associations.

Fred Oldroyd, 60, owner of coal mines in Illinois and Pennsylvania, died Jan. 7 at an Indiana, Pa., hospital from injuries received in an automobile accident the previous day. He was also a partner in the Old-Mar Mining Machinery Co., Cincinnati.

William T. Reid, for 17 years associated with the U. S. Bureau of Mines and most recently supervising engineer of its combustion research section, has joined the staff of Battelle Memorial Institute, Columbus, Ohio, where he will be engaged in the supervision of research in fuels and combustion.

Tom James, formerly master mechanic at the Galloway, W. Va., operation of the Simpson Creek Collieries Co., has joined the Elk Lick Coal Co., Richwood, W. Va., as manager of its mining operations. The company is building a modern tipple and cleaning plant and expects to enlarge its operations to 4,000 tons daily on a double-shift basis. The Sewell seam, varying in thickness from 4 to 5 ft., is to be mined.

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Obituary

G. Turner Howard, 69, president, Kentucky River Coal Corp., Lexington, Ky., since 1939, was killed Dec. 31 in an automobile accident near Campton, Ky., while on his way from Lexington to Hazard on business.

Edgar E. Thacker, 60, personnel director for the Eastern Coal Corp., Tierney Mining Co. and Premier Pocahontas Collieries Co., with offices in Bluefield, W. Va., died Dec. 22 in Marion, Ohio.

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Association Activities

Indiana Coal Preparation and Utilization Society at its December meeting elected M. A. Matthews, Templeton-Matthews Corp., president; William R. Caler, Enos Coal Mining Co., vice president; Roy Ault, Shasta Coal Co., vice president; and C. C. Lydick, managing director, Coal Trade Association of Indiana, secretary-treasurer.

Elected directors of the Society were: Ray Baughman, Sherwood-Templeton Coal Co.; J. S. Bond, Enos Coal Mining Co.; W. O. Bond, Snow Hill Coal Corp.; Ed Bottomley, Sunlight Coal Co.; Walter

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...and wherever wire rope works over sheaves—and on drums—there are also bending stresses. Heavy loads, too, add their burden.

You can depend on "Hercules" (Red-Strand) Wire Rope to meet all conditions, because it is the right combination and balance of strength, toughness and durability. As it is made in Round Strand and Flattened Strand constructions—both Preformed and Non-Preformed—there is a correct type for every duty purpose.

Let the Red-Strand be your wire rope guide to faster and more economical production. We invite your inquiries.

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THE SHEPPARD *Diesel delivers steady, low-cost power independent of outside interference.*

MY SHEPPARD *operates on low-cost domestic furnace oil. Storage of highly inflammable fuel is eliminated.*

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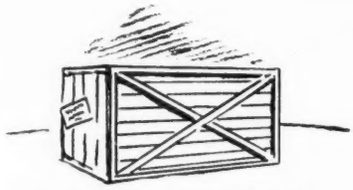
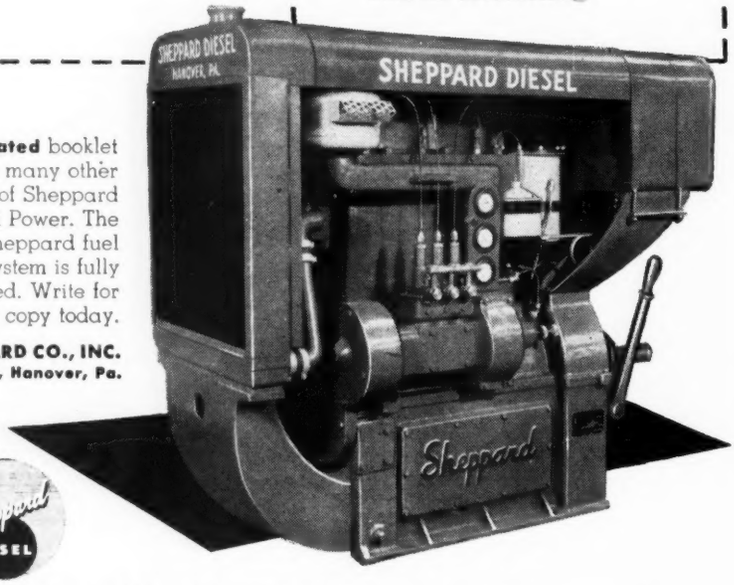


THE SHEPPARD *arrived fully equipped. It is rated by its actual continuous power delivery while operating with all accessories.*



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Buss, Knox Consolidated Coal Corp.; A. J. Cassell, Deep Vein Coal Co.; Carl Donie, Little Betty Mining Corp.; B. C. Dudley, Maumee Collieries Co.; H. O. Erb; Henry Fitch, Blackfoot Coal & Land Corp.; David Ingle Jr., Ingle Coal Corp.; Oscar C. Johnson, Socony-Vacuum Oil Co.; Charles Lammers, C.&E.I. R.R.; Hugh Lee Jr., Maumee Collieries Co.; J. W. McDivitt, Ayrshire Collieries Corp.; James Merle, Ayrshire Collieries Corp.; M. A. Tuttle, Knox Consolidated Coal Corp.; and A. E. Vatter, Walter Bledsoe & Co.

Northern Illinois Coal Trade Association at a recent meeting elected M. M. Soule, vice president of the United Electric Coal Cos., president. Other officers named were: William H. Cooke, president, Little Sister Coal Corp., vice president; T. C. Mullins, president, Northern Illinois Coal Corp. and Midland Electric Coal Corp., finance officer; and A. J. Christiansen, secretary.

Elected directors of the group were: Charles Shuler Jr., Alpha Coal Mine Co.; G. Don Sullivan, assistant to the president, Fairview Collieries Corp.; Harry M. Ziv, vice president, Walter Bledsoe & Co.; R. C. McElvain, president, Morris Coal & Mining Co. and Wilmington Coal Mining Corp.; R. H. May, manager of sales, Northern Illinois Coal Corp.; J. F. Lake, resident manager, Osage Coal Co.; H. C. Mead, mine manager, Pioneer Coal Co.; and J. O. Westlund, vice president, Truax-Traer Coal Co.

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Coal Publications

Intrinsic Safety of Electrical Apparatus—The Minimum Igniting Current in Relation to Circuit Constants, by G. Allsop, E. M. Guernault and A. D. I. Nicol, Safety in Mines Research Board. Paper No. 104. 15 pp., 6x9⅝-in.; paper; price, 15c. British Library of Information, 30 Rockefeller Plaza, New York, N. Y. The purpose is to find safe conditions for signaling purposes using 24 volts of primary current. Unsuitable signaling equipment has been found to ignite methanous air.

Labor Monopolies—Or Freedom, by John W. Scoville. 167 pp., 5x7½-in.; paper; price, $1, less for quantity. Committee for Constitutional Government, Inc., 205 E. 42d St., New York 17, N. Y.

How to Use Handicapped Workers, by Arthur T. Jacobs. 186 pp., 5½x8-in.; cloth; price, $3.50. National Foremen's Institute, Deep River, Conn. "No job," says this book, "requires use of all the physical, mental, or emotional capacities of human beings."

Will the Guaranteed Annual Wage Work?—An Evening With the Economists. 44 pp., 6x9-in.; paper; price, 50c., less for quantity. National Industrial Conference Board, 247 Park Ave., New York 17, N. Y. Pros and cons of the question as stated by 15 discussers at a forum.

An Investigation of a Laboratory Test for Determination of the Free-Swelling

YOU NEED TO TRY RED CROWN, TOO

6 RED CROWN ADVANTAGES

1. Red Crown is easy on the roof.
2. Slow heaving and spreading action with results similar to those obtained with the use of black powder.
3. Power distributed evenly throughout the face of the cut.
4. Coal displaced in firm, hard lumps means less degradation.
5. Red Crown, *containing no nitroglycerine*, is the non-headache permissible.
6. Less smoke and fumes means less idle time for expensive equipment.

WE CAN *TELL YOU* that Red Crown is the exclusive, patented Class A Permissible made by The King Powder Company only. That Red Crown's big feature is its *even* distribution of power. It's Red Crown's slow heaving and spreading action that brings down coal in firm, hard lumps—with less smoke and no obnoxious fumes. Red Crown minimizes down-time between shots.

BUT TRY RED CROWN YOURSELF under your own conditions. An actual test at your face is more convincing than words. See for yourself Red Crown's many advantages. Arrange today for a demonstration—why not phone or write us today? There is no obligation.

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Why try to ventilate the entire underground area when fresh air is needed only where men are working. Unless properly coursed, the air is thinned out and fails to give the workers the amount they should have. With Brattice Cloth, fresh air is channeled in full volume right to where it will help increase output.

ABC JUTE BRATTICE CLOTH seals off worked out sections and directs the flow of fresh air to the men. This rugged fabric is made from selected fibres, is uniform in thickness, and properly treated to resist flame, fungi, shrinkage and leakage. Long service life makes it economical. Made in two grades.

MINEVENT TUBING, where ducting is required, is the ideal flexible blower pipe. This tough, easily installed tubing withstands repeated handling, as well as acid water fungi and leakage. Made in three grades.

Take the first step toward more efficient ventilation by writing for ABC samples, or consult your ABC Mine Ventilation Engineer.

AMERICAN BRATTICE CLOTH CORP.
WARSAW, INDIANA

Index of Coal, by W. A. Selvig and W. H. Ode, U. S. Bureau of Mines. R. I. 3989. 10 pp., 8x10½-in.; paper; mimeograph; free. Provides a graph showing relation of areas of standard profiles to the corresponding swelling-index numbers of coals whose coke buttons do not conform to any of the standard profiles. The free-swelling index does not afford a measure of the expansion or contraction that occurs when coal is carbonized in a coke oven, and it should not be used as if it provided any such measure.

European Shale-Treating Practice, by W. W. Odell and E. L. Baldeschwieler, U. S. Bureau of Mines. I.C. 7348. 90 pp., 8x10½-in.; paper; mimeograph; free. Pumpherston retorts of Scotland apparently have not been considered suitable to economic production of the oil shales of continental Europe which, except those of Estonia, are of lower grade than those of the United States. Oil-shale treatments in Germany, France and Estonia are discussed.

Description of Typical Mine-Telephone Systems and Suggestions for Making Improved Installations, by C. L. Brown, U. S. Bureau of Mines. I.C. 7385, 17 pp., 8x10½-in.; paper; mimeograph; free. Better ways of installing telephones in coal mines.

Coal Mine Modernization, 1946 Year Book, The American Mining Congress. 288 pp., 6½x9-in.; imitation leather. Papers presented at the April 29-30, 1946, Annual Coal Convention of the American Mining Congress, held in Cincinnati, Ohio.

Mathematical Aids for Engineers, by R. W. Dull. 346 pp., 5⅜x7½-in.; cloth; price $4.50. McGraw-Hill Book Co., 330 W. 42d St., New York 18, N. Y. A practical presentation of problems confronting engineers. Not until p. 216 is the calculus involved in such presentation.

Fuels, Combustion and Furnaces, by J. Griswold. 496 pp., 6¼x9⅜-in.; cloth; price, $5.50. McGraw-Hill Book Co., 330 W. 42d St., New York 18, N. Y. Covers coal, oil and natural gas, the science of combustion, burners and stokers, heat transmission, refractories, furnaces and kilns.

Fuels and Fuel Burners, by K. Steiner and R. H. P. Miller. 394 pp., 5⅜x8¼-in.; cloth; price, $4.50. McGraw-Hill Publishing Co., 330 W. 42d St., New York 18, N. Y. Origin of fuels, elements of combustion, coal, oil, natural gas and wood, controls on combustion, chimneys, draft, control of heating systems, fans, motors and refractories.

Proceedings of the 36th Convention, Mine Inspectors' Institute of America, Wilkes-Barre, Pa., June 3-5, 1946. 191 pp., 6x9¼-in.; C. A. McDowell, Vesta Coal Co., California, Pa.

Metallizing Handbook, 86 pp., 6⅛x8½-in.; paper, price, $2. Metallizing Engineering Co. Inc., 38-14 30th St., Long Island City 1, N. Y. Covers preparation of surfaces, metallizing technique, finishing procedure, corrosion resistance, specific gravity, hardness, bond strength and relative shrinkage.

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There's more than one way to do a stripping job, but I never saw one that could beat this. We thought we used to do pretty well until our Oliver "Cletrac" dealer happened to drop in one day.

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His suggestion gave our production a real lift. The Oliver "Cletrac" dealer sure knows his business and is a big help in ours.

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NEW LIFE FOR OLD CABLES

7 Point Superiority

1 Double grip . . . both sides adhesive.

2 Great tensile strength . . . tough.

3 Won't tear, ravel or pucker.

4 Resists abrasion.

5 Acid- and alkali-proof.

6 Extra thick . . . one layer insulates.

7 Exceeds A.S.T.M. specifications by 300% in adhesiveness, 26% in tensile strength, 290% in dielectric strength.

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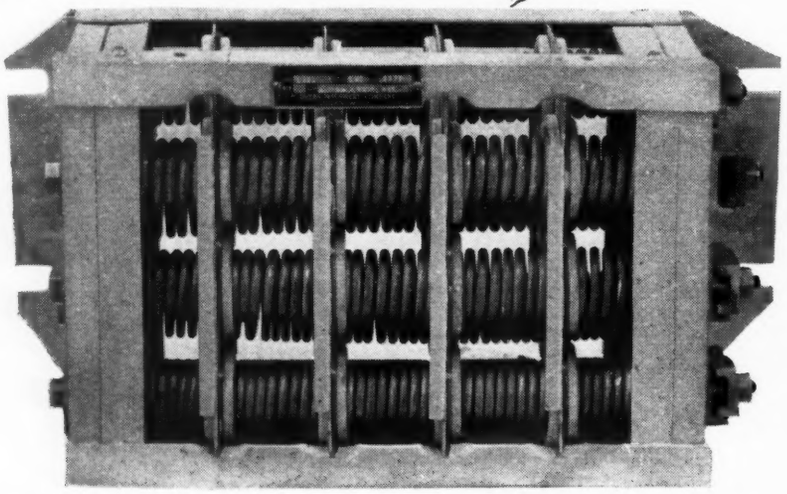

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Let us know the model and make of your mining machines and we'll furnish Guyan Resistance units with the same number of taps, numbered the same as the original wiring diagram and with bolt holes that line up!

Write for the Guyan Catalog now.

Studies on Explosives and Explosions, Fiscal Year 1945, by W. J. Huff, U. S. Bureau of Mines. R.I. 4031. 73 pp., 8x10½-in.; paper; mimeograph; free. Investigations of hazards in use of diesel engines underground. Studies on the raising of charge limits from 1.5 to 3 lb. are recorded. Other studies were made on explosibility of potassium perchlorate, on effect of sheaths on gaseous products from permissibles and on effect of humidity on sensitivity and dispersion of black powder.

Geology and Coal Occurrences of Wapiti-Cutbank Area, Alberta, by J. A. Allen and J. L. Carr, Research Council of Alberta, Edmonton, Alta. Report No. 48. 6½x10-in.; paper; price, 50c. Though aggregate coal thickness in all seams in one section is 12 ft. 6 in. the thickest clean seam is 3 ft. 1 in. Any value that this coal may have is due to its remoteness from better Alberta coal. Moisture as recorded runs from 10.3 to 22.5 percent.

Accident Prevention Manual, by engineering staff of industrial, statistical, traffic and transportation divisions, National Safety Council, 20 North Wacker Drive, Chicago 6. 534 pp., 5¾x9-in.; cloth; price, $7. Relates to everything industrial, except what is usually designated "mining," but mining has electricity, repair and even construction, carpentry shops, machine shops, railroad sidings, laboratories, demolition, stores, trucks, hygiene hazards, etc., and all these are treated in this book. Men around the mine may not be as well acquainted with these hazards as with true mining risks and therefore may be the more in need of advice. This book serves as an encyclopedia of such matters.

Yields and Properties of Gases From BM-AGA Carbonization Tests at 900 Deg. C., by D. E. Wolfson and D. A. Reynolds, U. S. Bureau of Mines. T.P. 693. 12 pp., 5¾x9-in.; paper; free. Specific gravity of the gases, their heating value and their carbon dioxide, illuminants, carbon monoxide, methane and ethane. These gases decrease with increase in maturity (rank), whereas hydrogen increases with such increase. Lower maturity coals are not tabulated, because too few have been tested.

Carbonizing Properties of Western Coals, by D. A. Reynolds, J. D. Davis, R. E. Brower, W. H. Ode, D. E. Wolfson and G. W. Birge, U. S. Bureau of Mines. T.P. 692. 79 pp., 5⅞x9⅛-in.; paper; price, 20c. U. S. Government Printing Office, Washington 25, D. C.

Carbonizing Properties of Velva Lignite From Ward County, North Dakota and Monarch Coal From Sheridan County Wyoming. U. S. Bureau of Mines. T.P. 695. 41 pp., 5⅞x9⅛-in.; paper; price, 10c. U. S. Government Printing Office, Washington 25, D. C.

Organic Acids by Direct Oxidation of Coal, by N. W. Franke and M. W. Kiebler. Contribution 133. 4 pp., 6x9-in. **Accomplishments of Coal Research Laboratory,** by H. H. Lowry. Contribution 134. 7 pp., 6x9-in. **Rates of Distillation of the Benzene Carboxylic Acids, and Their Methyl Esters,** by G. Schulz and H. C. Howard. Contribution 135. 8 pp., 6x9-in. Oxida-

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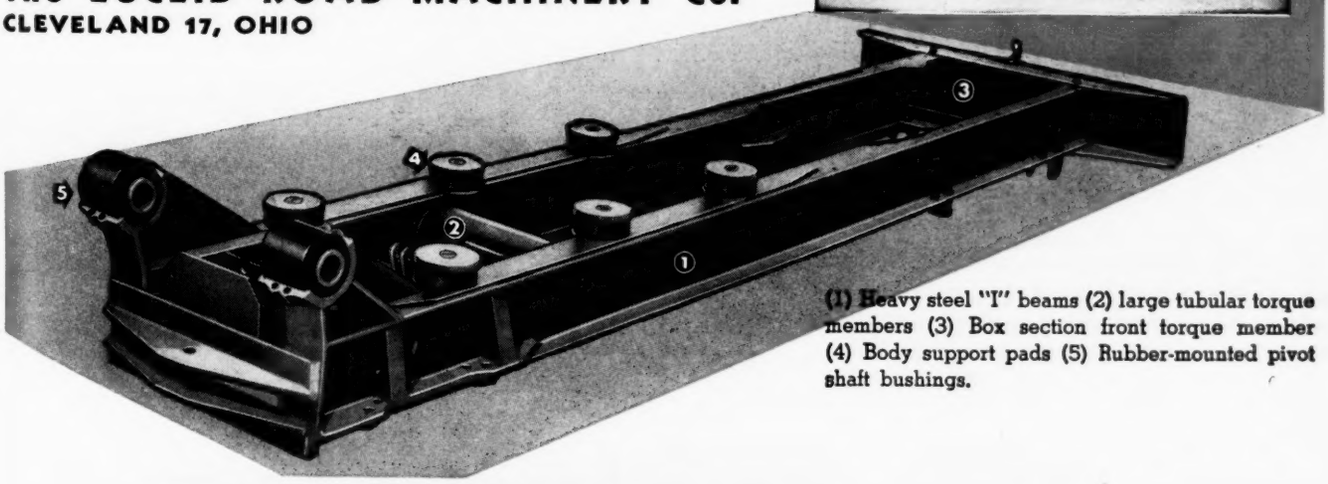
A FRAME OF UNMATCHED STRENGTH

Hauling equipment used in off-the-highway work must be designed and built to move large loads over difficult haul roads at low cost. It must have rugged "staying power" for the hard usage and varying conditions of mining, construction and quarry operations.

The strong, rigid frame is the backbone of the Rear-Dump Euclid, the hauling unit that has proved its dependable, low cost performance on hundreds of the toughest jobs. Constructed of wide-flanged, deep sectioned "I" beams stiffened by large tubular and box section torque members, the Euclid frame is built to last for the life of the truck. The body is cushioned on large rubber support pads which absorb the heavy impacts of loading and hauling over rough roads . . . there is no metal to metal contact between the body and frame.

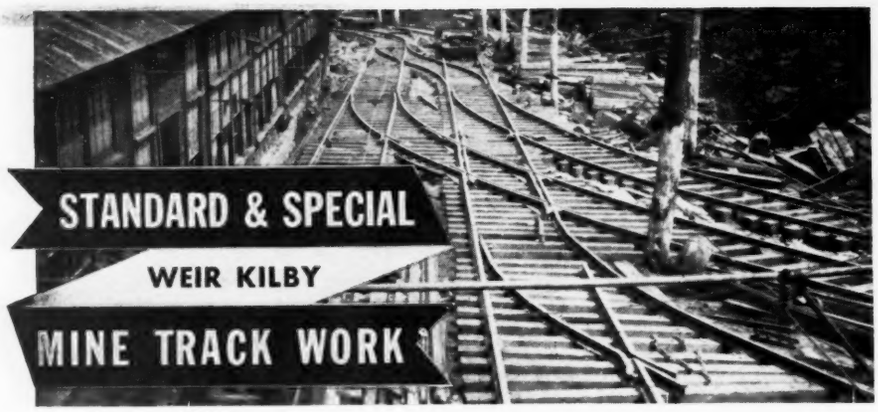
Ask your Distributor to show you how all Euclid models, Rear-Dump and Bottom-Dump, are built *throughout* for long lasting, efficient off-the-highway service.

The EUCLID ROAD MACHINERY Co.
CLEVELAND 17, OHIO



(1) Heavy steel "I" beams (2) large tubular torque members (3) Box section front torque member (4) Body support pads (5) Rubber-mounted pivot shaft bushings.

EUCLIDS *Move the Earth*



One of the surest ways to speed up coal production in these days of phenomenal demand, is to plan at once for the most efficient possible trackage, inside and outside the mine. Weir Kilby has developed many light weight and medium weight elements of track work especially for the mines.

We constantly carry in stock hundreds of mine turnouts, complete with Weir Titan Frogs, switch points, and stands in the standard angles and various rail sections, so as to facilitate immediate shipments. For other needs, your orders will be made up in the shortest possible time.

CATALOG "H" comprises 154 pages of helpful data, replete with photos, drawings and specifications, covers every track work need. A request on your letterhead will bring your copy promptly.

Suppliers to Mines and Railroads ***Since 1882***

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tion Products of Certain Petrographic Constituents of Bituminous Coals, by G. Schulz and H. C. Howard. Contribution 136. 7 pp., 6x9-in. Coal Research Laboratory, Carnegie Institute of Technology, Pittsburgh, Pa.

•

Mine Fatality Rate Drops in November

Accidents at coal mines in the United States caused the deaths of 42 bituminous miners and 10 anthracite miners in November, 1946, according to reports furnished the U. S. Bureau of Mines by State mine inspectors.

For the two industries combined, the November, 1946, fatality rate was 1.23 per million tons, considerably lower than that of 1.66 for October, 1946, and also less than that of 1.25 for November, 1945, later revised to 1.46.

With a production of 37,390,000 net tons, the November bituminous fatality rate was 1.12 per million tons, compared with 1.50 in October and a revised rate of 1.418 in November, 1945.

The anthracite rate in November, 1946, in mining 4,990,000 net tons, was 2.00 per million tons, as compared with the October rate of 3.33 and the revised figure of 1.974 for November, 1945.

November, 1946, fatalities, by causes and States, and the comparable rates for the first eleven months of 1946 and 1945, were as follows:

THE MERRICK

FEEDOWEIGHT

Reg. U. S. Pat. Off.

tells rate per hour —weight per day

A self-contained automatic conveyor scale, combined with automatic gate to give feed rate control. Powered feed regulator operates gate, without restraint on scale beam. Feed rate may be varied. Large feed opening insures even flow. Uniformly feeds bulk material BY WEIGHT; and automatically totalizes weight of materials fed. Durable. Simple to operate. Rugged, heavy duty design. Slow moving parts mean long life. Easy to install and maintain.

Manufacturers of

The Merrick WEIGHTOMETER, which weighs any material carried on a belt conveyor without interrupting conveying operation. Complete descriptive matter on request.

MERRICK SCALE MFG. CO.

Engineers & Mfgrs. of Automatic Weighing Equipment

PASSAIC, N. J., U. S. A.

U. S. COAL-MINE FATALITIES IN NOVEMBER, 1946, BY CAUSES AND STATES

State	Underground: Falls of roof	Underground: Haulage	Underground: Gas or dust explosions	Underground: Explosives	Underground: Electricity	Underground: Other Causes	Underground: Total underground	Open-cut	Surface	Grand total
Alabama	..	..	2	..	..	..	2	..	1	3
Illinois	3	..	..	..	..	..	3	..	..	3
Kentucky	6	2	..	..	..	..	8	..	..	8
Maryland	1	..	..	..	..	..	1	..	..	1
North Dakota	..	..	..	..	..	..	..	1	..	1
Ohio	1	..	..	..	..	..	1	..	1	2
Pennsylvania (bituminous)	3	..	..	..	..	..	3	..	..	3
Tennessee	2	..	..	..	..	..	2	..	..	2
Utah	..	..	..	..	..	1	1	..	..	1
Virginia	..	..	..	..	1	..	1	..	..	1
West Virginia	9	6	..	..	..	..	15	..	..	15
Wyoming	2	..	..	..	..	..	2	..	..	2
Total bituminous	27	8	2	..	1	1	39	1	2	42
Pennsylvania (anthracite)	6	1	..	1	..	..	8	1	1	10
Grand Total	33	9	2	1	1	1	47	2	3	52

DEATHS AND FATALITY RATES AT U. S. COAL MINES, BY CAUSES OF ACCIDENTS* JANUARY-NOVEMBER 1946 AND 1945

Cause	Bituminous: Number Killed 1946	1945	Bituminous: Killed per Million Tons 1946	1945	Anthracite: Number Killed 1946	1945	Anthracite: Killed per Million Tons 1946	1945	Total: Number Killed 1946	1945	Total: Killed per Million Tons 1946	1945
Underground:												
Falls of roof and face	386	428	0.795	0.809	92	67	1.655	1.315	478	495	0.884	0.854
Haulage	142	191	.293	.361	21	22	.378	.432	163	213	.301	.367
Gas or dust explosions:												
Local	3	10	.006	.019	....	5	....	.098	3	15	.006	.026
Major	27	39	.056	.074	....	....	....	....	27	39	.050	.067
Explosives	10	25	.021	.047	8	9	.144	.177	18	34	.033	.059
Electricity	21	20	.043	.038	3	2	.054	.039	24	22	.044	.038
Machinery	23	37	.048	.070	1	2	.018	.039	24	39	.044	.067
Shaft	7	10	.014	.019	1	1	.018	.020	8	11	.015	.019
Miscellaneous	21	15	.043	.028	13	11	.233	.216	34	26	.063	.045
Total underground	640	775	1.319	1.465	139	119	2.500	2.336	779	894	1.440	1.542
Stripping or open-cut	16	24	.033	.045	9	2	.162	.039	25	26	.046	.045
Surface	38	57	.078	.108	9	10	.162	.197	47	67	.087	.115
Grand Total	694	856	1.430	1.618	157	131	2.824	2.572	851	987	1.573	1.702

* All figures are subject to revision.

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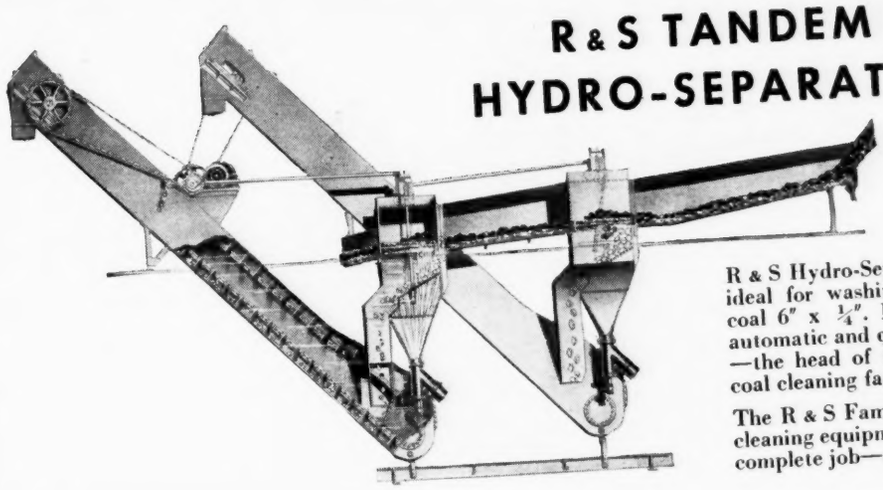
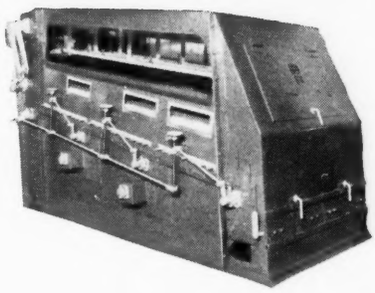
OF COAL CLEANING EQUIPMENT

R&S TANDEM HYDRO-SEPARATOR



R & S Hydro-Separator is ideal for washing coarse coal 6" x ¼". It is fully automatic and continuous —the head of the R & S coal cleaning family.

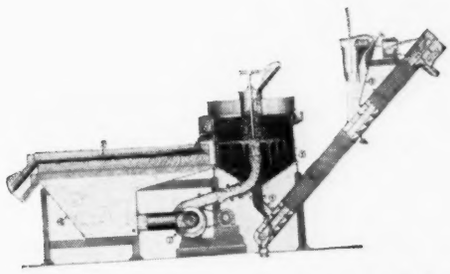
The R & S Family of coal cleaning equipment does a complete job—a good job.



R&S STUMP AIR FLOW CLEANER

R & S Stump Air Flow Cleaner is a highly efficient unit where dry cleaning of coal is desirable and the coal amenable to this process.

The R & S Family of coal cleaning equipment does a complete job—a good job.



R&S HYDROTATORS

R & S Hydrotator process for smaller coal sizes ¼" x 0" in combination with the Hydro-Separator above forms a complete cleaning plant . . . promotes total low cost mechanization underground.

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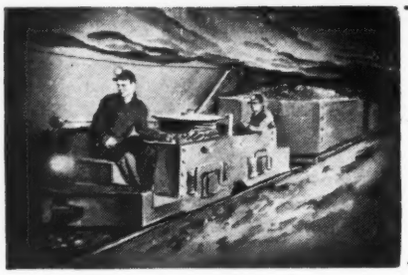


Equipment News

More Detailed Information and Descriptive Literature Normally Are Available on Request Directly to the Manufacturer

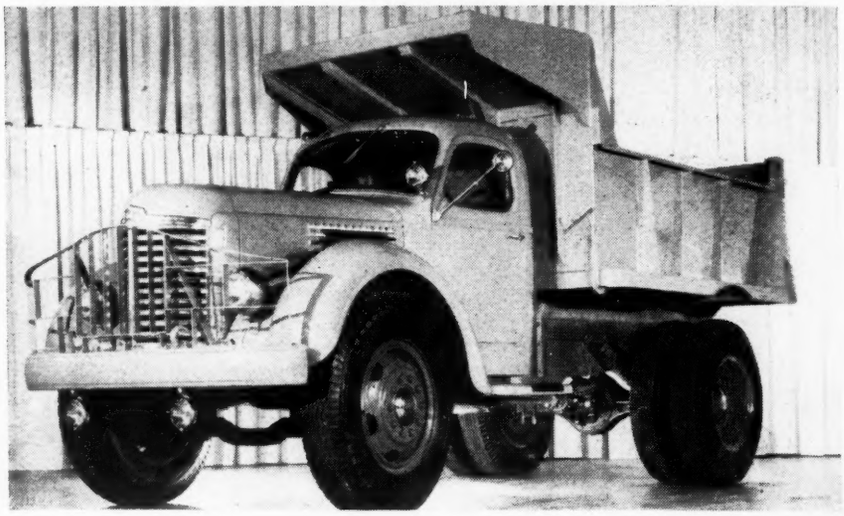
Trucks

At a presentation Jan. 17 at its Ft. Wayne, Ind., works, which also marked its 40th anniversary in the motor truck field, the International Harvester Co. exhibited for the first time its new "KB" line of trucks, together with its recently introduced "W" or "Western" models.

Throughout the new line, in addition to new styling, are 95 new features or mechanical improvements, all contributing to improved performance, longer life and greater economy, according to company officials. New features and improvements are under constant study and constant test, it was explained, and as quickly as a new feature or improvement proves its worth, it is incorporated into current production.

In stressing International's program of truck specialization that seeks to fit a truck to its job to deliver efficient, economical service, officials pointed out that the 15 basic models in the "KB" line and the six in the "W" line adapt and convert into more than 1,000 different trucks, each delivered from the production line as an engineered unit, precisely fitted to the job as analyzed by International's sales engineering staff. Study of load requirements, road and grade conditions, normal speeds and other conditions by the sales engineering staff, in addition, enables truck operators to get the most out of their trucks in terms of payloads carried, to hold operating costs down through observance of load limits and to get long, trouble-free service by determining where overload points come.

Gross-vehicle-weight ratings of the new "KB" line range from 4,400 lb. for the light-duty KB-1 to 37,000-48,000 lb. for the KBR-11-F. In the "W" line, two are highway models with gross-vehicle-weight ratings of 30,000 and 40,000 lb. and four are off-highway models with ratings from 40,000 to 90,000 lb. The 21 basic models utilize 13 different engines, with piston displacements ranging from 213 to 1,090 cu.in. In the heavier models both diesel and butane fuels can be used.



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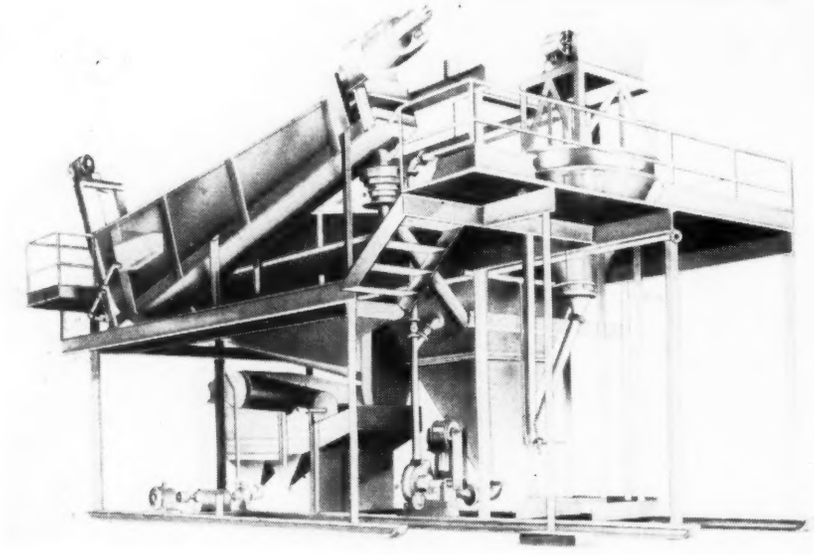
Heavy Media Plant

Western-Knapp Engr. Co., 760 Folsom St., San Francisco, Calif., has announced the development of a new semi-portable heavy-media separation plant, known as the "Mobi-Mill," designed for use, among other things, as a development plant where conditions do not justify a heavy capital expenditure, and for increasing capacity of existing plants.

Selection of the equipment contained is based on the analysis of practical application of heavy-media-separation machinery in operating plants active in the industry, according to the manufacturer, and the design meets American Cyanamid Co. standards. The plant can be quickly assembled in the field, dismantled and moved to a new site with little effort and relatively low cost. It requires an area of only 12½x26 ft., with a height of 13½ ft., and capacity varies from 5 to 15 t.p.h., depending on the type of material handled. The plant is said to be ideally suited wherever heavy media separation is applicable and can be acquired either by outright purchase or on a rental basis.

•



Shovel Combination

Marion Power Shovel Co., Marion, Ohio, has announced the Marion 93-M, a heavy duty, all-purpose shovel, dragline, clamshell and crane. One of three new Marions since V-J day, the 93-M is a full-rated 2½-cu.yd. machine designed for mining, quarrying and large-scale construction projects, particularly those involving ore and rock.

Features of the new machine include Marion air control, ease of convertibility to dragline, clamshell and crane service, ease of preparation for railroad shipment, simplicity and accessibility of all machinery and moving parts, careful proportioning of stout construction and ample power for heavy duty service, according to the manufacturer. Shovel front-end equipment includes an all-welded rounded-edge box section boom, twin-welded full-box sec-

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PERMASET PRE-FORMED

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Dragline and shovel operators reduce down-time on their equipment by use of J&L Precisionbilt Wire Rope. Its extra dependability keeps their equipment on the job, reduces maintenance costs.

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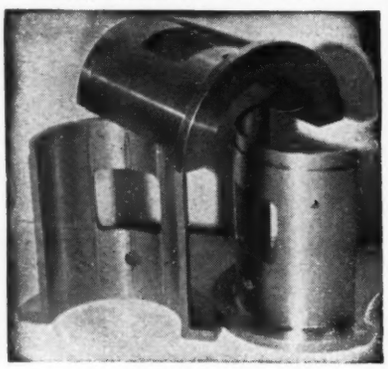

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Lead base, all virgin metals, perfectly alloyed. Fine, velvety grain. Entire bearing surface wears uniformly, without pitting. Unaffected by moisture. Simply heat to 900°-950° and pour.
Can be repeatedly remelted and reworked. Repouring only refines it. No appreciable shrinkage, hence better contact with supporting shell, a more solid, rigid bearing. Supplied in 10 lb. pigs.

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tion dipper handles and a heavy duty manganese-steel-front dipper with inserted socket-type dipper teeth. For dragline or clamshell service, varying boom lengths and bucket combinations are available as job conditions may require and a live boom hoist is standard equipment, making the machine particularly adaptable to crane service, it is said.

•

Bulldozer

Bulldozers and grade builders developed especially for the new Allis-Chalmers 2-cycle diesel-powered HD-5 tractor have been announced by the Baker Mfg. Co., Springfield, Ill. Starting from tractor blue-

prints, according to the announcement, the Baker 'dozers were designed to the HD-5 to match tractor power size and speed, built to maintain tractor balance, stability and traction and mounted to save wear, tear and maintenance. They are said to offer the following built-in bulldozer advantages: direct down pressure, low-pressure hydraulic system, less linkage, fast blade control and rolling blade action.

•

Electrodes

High-carbon electrodes for building up worn steel parts by welding with low-voltage a.c. transformers, as well as d.c., and a new electrode for welding high-sulphur free-machining steel and certain high-tensile low-alloy steels, have been announced by The Lincoln Electric Co., Cleveland, Ohio.

Designated as "Hardweld 50 A. C." and "Hardweld 100 A. C.," the new high-carbon electrodes open a new field in the application of a.c. welders to produce a dense, tough surface of moderate hardness to resist shock and abrasion, according to the manufacturer. They are said to have a heavily extruded shielded-arc-type coating and produce flat, smooth beads. The deposits can be hot-forged. "Hardweld 100 A. C." has a hardness of deposit on straight carbon steel when allowed to cool

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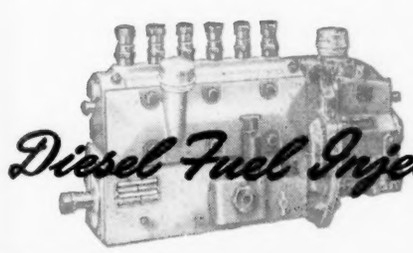
At American Bosch, engineering experience born of years of doing is at the service of Diesel users everywhere. Pooled with the Diesel Builders' own knowledge, this specialized fuel injection experience is at work today on the better, lighter, more efficient Diesels of the future.

Production skill and capacity which have kept pace with the industry's growth bring the engineers' work to reality. Widespread field service keeps the equipment operating efficiently.

Thus American Bosch experience serves from the conception of the engine to the product at work, which may serve to explain why a majority of America's Diesel Builders equip their engines with American Bosch Fuel Injection. AMERICAN BOSCH CORPORATION, Springfield 7, Mass.



Diesel Fuel Injection

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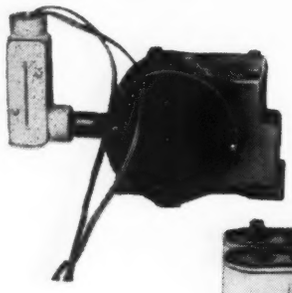

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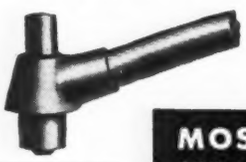

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naturally of 20 to 45 Rockwell C., the exact hardness depending upon rate of cooling and carbon content of the steel welded. "Hardweld 50 A. C." on straight carbon steel has a hardness of 20 to 35 Rockwell C. Deposits may be further hardened.

The new "Shield-Arc LH-70" electrode has a low-hydrogen low-moisture coating and is designed for use with d.c. polarity, as the welded tensile properties are 70,000-80,000 tensile strength and elongation is 25 to 30 percent. Welding currents used are high in comparison with other all-position-type electrodes and a rather short arc is recommended.

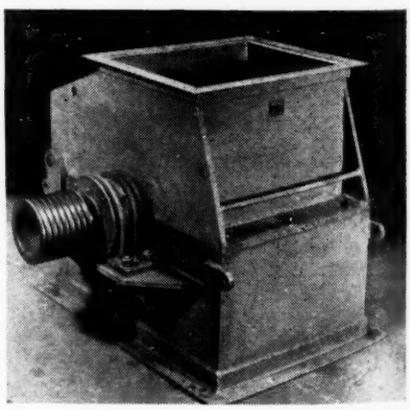
"Shield-Arc LH-70" makes possible a weld in less time, according to the company, on a number of types of steel and preheating of high-tensile, low-alloy steels can now be eliminated or largely reduced. Welds of exceptional toughness can be made on high-carbon and other steels that tend to show underbead cracking when welded with the usual type of electrodes. Welding high-silicon electrical sheet steel is highly practicable with the new electrode, and high-sulphur steels can be welded as readily as low-sulphur mild steel, it is said. In using the new electrode, vertical welds are made from the bottom up. Overhead welds may be made with a narrow lateral weave.

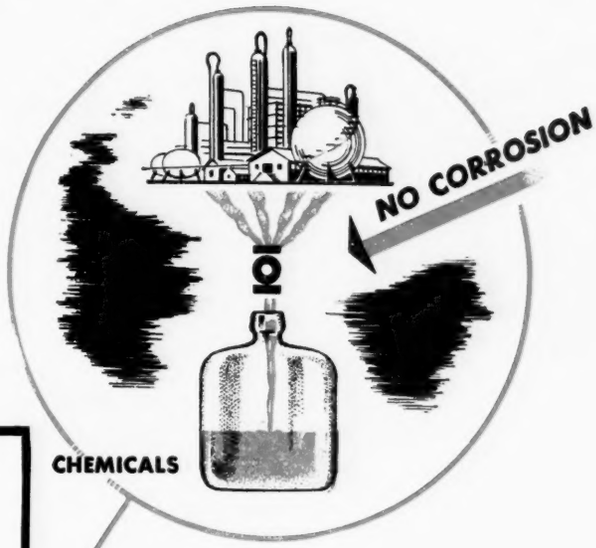
•

Hammer Mill

Addition of a new, heavy-duty model Buffalo hammer mill to its line of 16 standard types has been announced by the Buffalo Hammer Mill Corp., Buffalo 3, N. Y. The new Model W-30 hammer mill has an over-all height of 47 in., a base 53x38 in., a charge opening 24x30 in. and may be used for grinding, pulverizing, crushing, shredding, defiberizing and hashing various materials.

Buffalo Hammer Mills break up all sizes of material by shattering blows of several batteries of revolving hardened-steel hammers at 1,000 to 7,500 r.p.m., according to the manufacturer. Material is hit while suspended in mid air to eliminate generation of heat from the friction of rubbing and crushing actions. With the elimination of heat, less power is required and both wear and break-downs are reduced to a minimum, it is said. Material may be discharged two ways, by gravity from the bottom of the machine, and by conveying pneumatically to a collection system.





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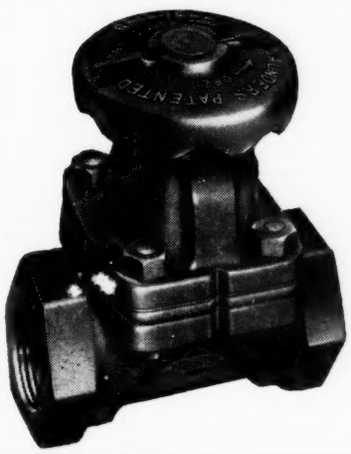
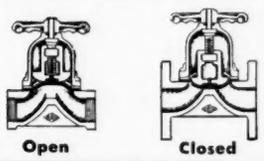
GRINNELL-SAUNDERS DIAPHRAGM VALVES



● The flexible diaphragm isolates the working parts of the valve from the fluid, preventing contamination, and permits streamlined flow plus positive closure even with suspended solids.

A selection of diaphragm materials and also body linings of glass, porcelain, lead, rubber or synthetics protects against corrosion.



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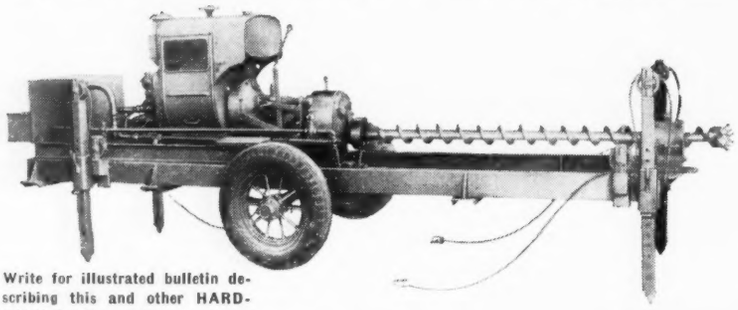

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This flexible air tubing is ready for immediate, easy installation. On account of its flexibility, it can be put up or taken down in a fractional part of the time required by more rigid means of face ventilation.

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MORE HAULAGE FOR 20% LESS BATTERY CAPACITY

Oil-tight, non-leak transmission. Use regular auto oil; change every 6 months.

Strong, Simple, Low maintenance cost.

Extra-long journal springs assure better trackability.

Large motor, to assure more horsepower per ton weight of locomotive.

Can be equipped with hydraulic brake.

GREENSBURG "RANGER"

This locomotive being used for main line haulage at the Blacksmith Coal Company, Novinger, Missouri. This is a 4½ ton locomotive, operating on 30" gauge track. This locomotive built from 3½ to 10 tons – either single or double motor-drive – 16" to 56½" track gauge.

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Rubber Boot

New-type super-quality waterproof footwear for miners that is much lighter than conventional miners' footwear and yet in actual test has been found to give greater satisfaction and frequently to stay waterproof longer than lace rubber shoes has been developed by the Mishawaka Rubber & Woolen Mfg. Co., Mishawaka, Ind. Made by a special process, and known as

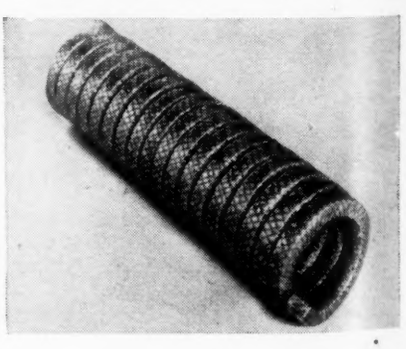
"Ball-Band Liqua-Tex," the uppers are sealed in continuous layer of liquid latex that assures the utmost in waterproofing, it is said.

Miners who have worn these boots on wear tests have expressed their hearty approval of the new type boot, which combines all the advantages of light weight and flexibility with sufficient strength to stand up under severe use in mines, the manufacturer states. A feature especially appreciated is the ease and speed with which the boot can be put on and taken off. Instead of conventional front lacing, a special one-eyelet lacing tab is provided on the back of the boot, which provides an added safety feature in that it is out of the way and is not liable to catch on projecting rocks, timbers, etc.

•

Metallic Packing

A new flexible metallic packing for steam and air rods, centrifugal-pump shafts, valve stems, and expansion joints where the temperatures do not exceed 450 deg. F. or surface speed is not greater than 600 f.p.m. has been developed by Ray-

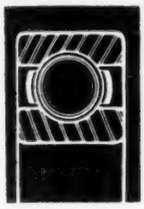


2

The Single Row Ball Bearing

ITS USE AND ADVANTAGES

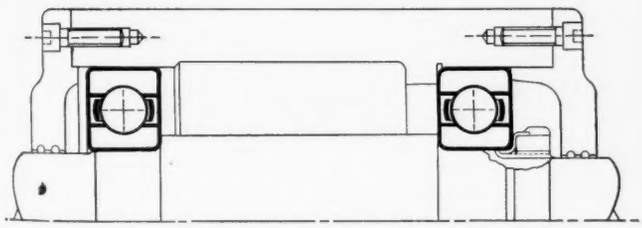
AS PRODUCED BY NORMA-HOFFMANN



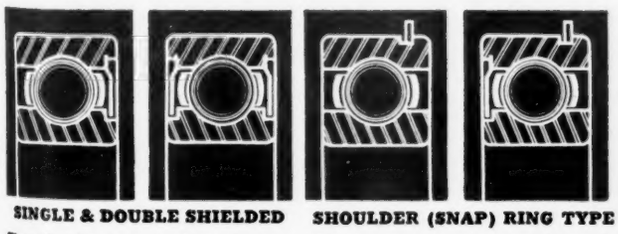
DEEP GROOVE NON-FILLING SLOT TYPE

This is the most widely used type of all anti-friction bearings. It can carry both radial and comparatively heavy thrust loads. Its uninterrupted, symmetrical raceways and self-contained, deep-groove design give it a wide range of application. Special types are available with ultra-precision tolerances. Here are some of its advantages:

- Self-contained. Can be handled and mounted as a complete unit.
- Has equal thrust capacity in either direction.
- Close conformity of raceway with ball contour provides maximum load support.
- No adjustment. Bearings delivered with required internal clearance.



- In two-bearing applications (as above) one bearing can be locked in the housing, the other "floated." This allows for expansion due to temperature changes and compensates for variables in machining shaft and housing shoulders.



SINGLE & DOUBLE SHIELDED

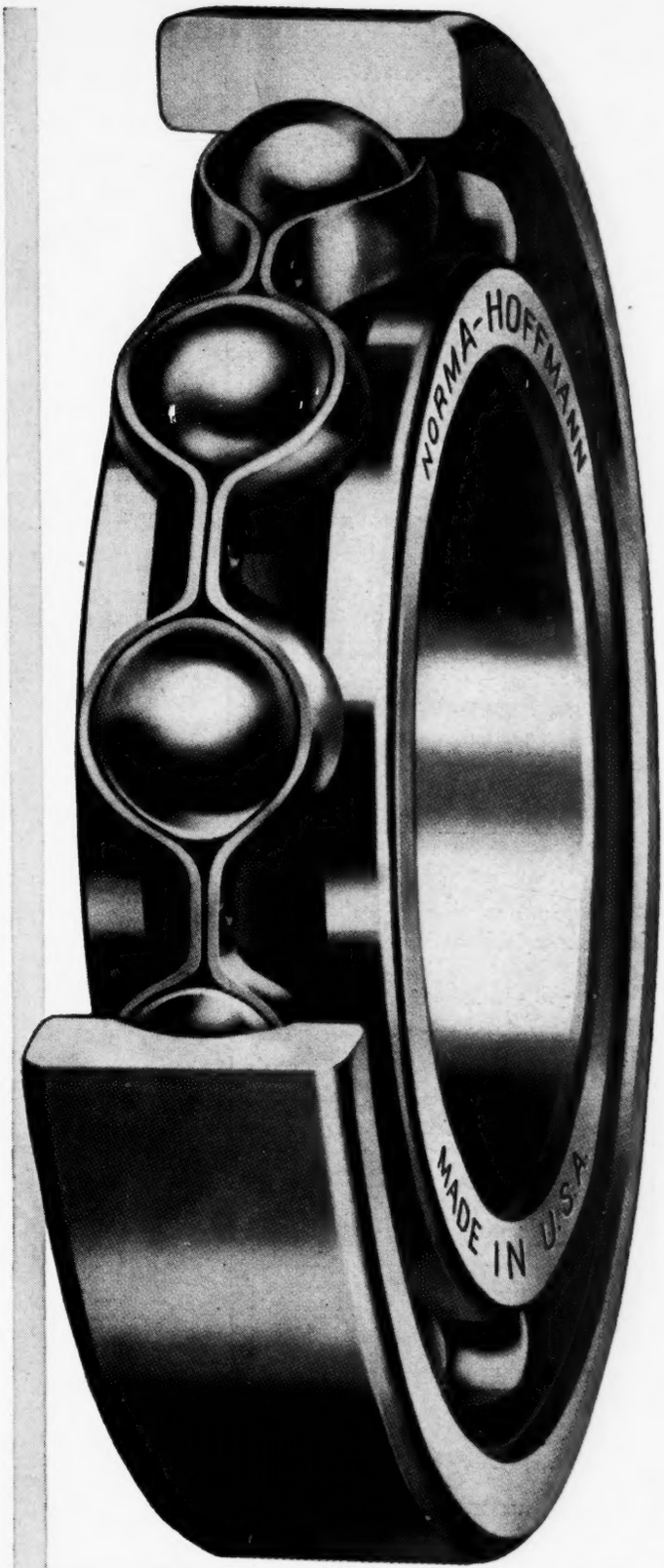
The side plates are fixed in outer ring and extend into recess of inner ring forming labyrinth to retain grease, exclude dirt.

1. Provides economical closure for many ordinary uses.
2. Supplements other seals for extra dirty applications.
3. Occupies no greater space than standard single row bearing.
4. Pre-packed with Norma "Stability-Tested" Grease; long service without relubrication is assured.

SHOULDER (SNAP) RING TYPE

This bearing is equipped with a split metal locating ring which is snapped into a groove in the outer ring of the bearing.

1. Self-locating; no need for providing machined housing shoulders.
2. Permits simplest housing: a straight through bore.
3. Provides longitudinal compactness with saving of materials and weight.



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MANAGEMENT and PRODUCTION men want

FACTS

about equipment they buy

Here are FACTS about

Coffing Hoists

"SAFETY-PULL"
Ratchet Lever Hoists

For all kinds of construction and maintenance work, wherever a lift or pull is needed, there is a "Safety - Pull" to meet your requirements. SAFE, DURABLE, DEPENDABLE. Capacities range from ¾ to 15 tons, yet they weigh only 14 to 150 pounds.

"QUIK-LIFT"
Electric Hoists

For dependable and economical service the "Quik - Lift" incorporates EFFICIENCY with SPEED, POWER and DURABILITY. Just plug it in and speed up production. Capacities from 500 to 4000 pounds with lifting speeds from 4 to 49 feet per minute.

MODEL Y-C
Spur Geared Chain Hoists

Coffing Spur Geared Chain Hoists embody the planetary gear system with the Weston automatic brake. There are seven capacities ranging from ½ to 5 tons. A sturdy, dependable hoist for heavy work and in the production line.

Contact Your Supplier or Write for
BULLETIN GC-100

Coffing Hoist Co.
Danville, Illinois U. S. A.

bestos-Manhattan, Inc., Manheim, Pa.

The product incorporates a cross-sectional composition of non-frictional metallic foil combined with asbestos yarns, high-temperature resistant lubricants and flake graphite for effectively sealing and reducing frictional wear. According to the manufacturer, this construction produces a compressible metallic packing that is sensitive to gland adjustment.

•

Goggle

A new rubber-frame goggle equipped with a large single acetate lens and specifically designed to protect workers against chemical and dust hazards has been announced by the American Optical Co., Southbridge, Mass. The goggle can be worn in combination with the company's R-1000 respirator and provides exceptional

wide-angle vision, good ventilation and long wearing comfort, according to the manufacturer. It may be worn directly over the eyes or over most types of prescription glasses and is said to protect against chemical splashes, spray, the impact of foreign particles and exposure to fine-dust concentrations.

The goggle's closely fitting face-form frame is molded from non-irritating acid-resisting synthetic rubber and perforations at top and sides of goggle allow ample ventilation to reduce the possibility of fogging. The goggle is equipped with a large acetate single lens—slow burning and shatter-resistant—and is so designed that the lens can be easily replaced.

•

Fire Extinguisher

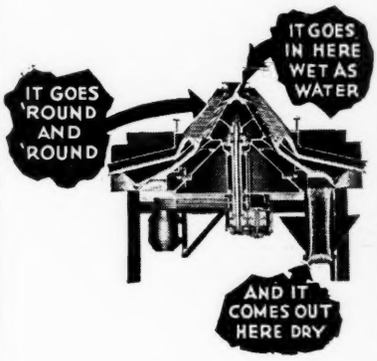
A new "midget" fire extinguisher is announced by American-LaFrance-Foamite Corp., Elmira, N. Y. Called the "Alfco Speedex," its contents weigh only 3⅜ lb. but expand upon release to 450 times their contained volume, according to the company.

The extinguisher is 3⅞ in. in diameter, has an over-all length of 22 in. and is operated by a quick-acting squeeze-type valve that releases the carbon-dioxide extinguishing agent by palm pressure. "Speedex" carbon-dioxide gas is non-poisonous, non-corrosive and odorless. It is a non-conductor of electricity and will not freeze at any climatic temperature. It is heavier than air.

The "C·M·I" CONTINUOUS CENTRIFUGAL

The many installations of these "C-M-I" dryers in coal washing plants from Pennsylvania to Washington and Illinois to Alabama have proved that *all sizes* below ⅜ inch are delivered from "C-M-I"s with less surface moisture than can be obtained from any other type of mechanical dryer or dewaterer.

And at a cost of only a few cents per ton.



Let us tell you where these machines are in operation so that you may contact the operators and obtain from them full data on an operation similar to your own.

CENTRIFUGAL AND MECHANICAL INDUSTRIES
INC.
3600 SOUTH SECOND STREET
ST. LOUIS 18, MO.

"Per Ton" Cost REDUCED

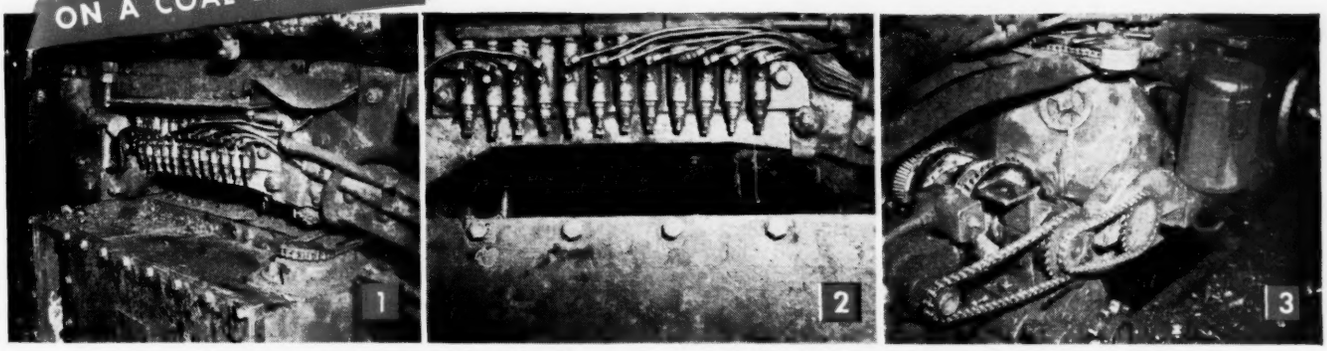
with LINCOLN Single Line CENTRO-MATIC LUBRICATING SYSTEMS

Year after year, in many mines, literally thousands of dollars are leaking away in lost production time, replacement parts, excessive maintenance labor, wasted lubricants, accident bills—troubles that so frequently are caused by faulty methods of lubrication.

These losses can be curbed, and production can be increased by installing Lincoln Centro-Matic Lubricating Systems.

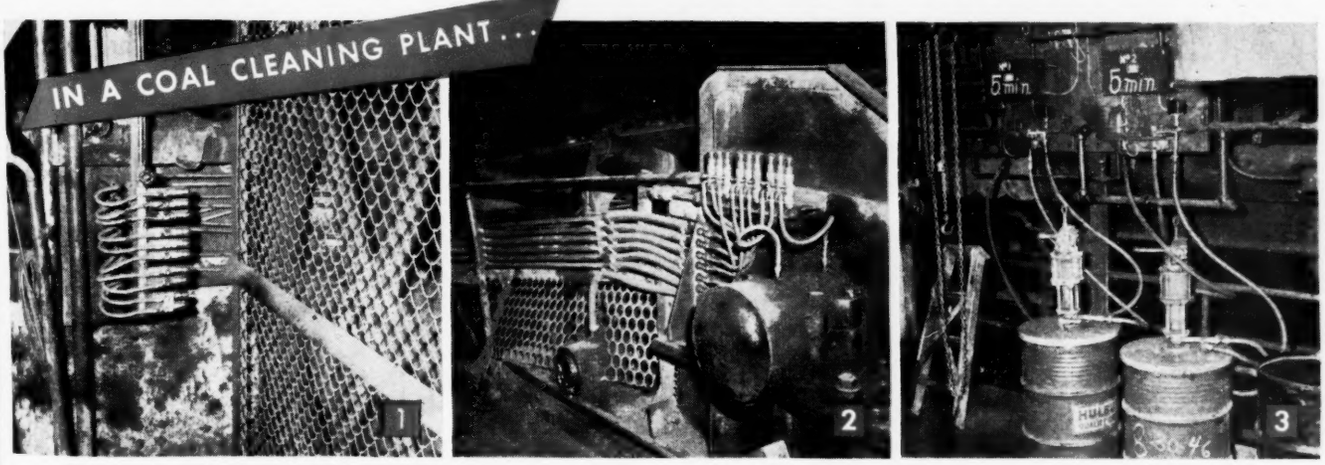
There is a Centro-Matic System available for practically all types of coal mining machinery and equipment. The system consists of a suitable lubricant pump; an injector of proper capacity for each bearing; a single lubricant supply line connecting pump to injectors; and a tubing or flexible high-pressure hose connection from injector to bearing. Lubricant pumps are available in hand, air, or electrically operated models. Air and electrically operated pumps may be equipped with a time clock for fully automatic operation. Centro-Matic Systems are easily installed.

ON A COAL LOADER . . .



An automatic coal loader equipped with a Lincoln Centro-Matic System consisting of 51 adjustable injectors grouped in manifold, see photos (1) and (2). Each injector is attached to a bearing by copper tubing or high-pressure flexible hose and swivel. Lubricant pump has 22-lb. capacity and is powered by direct drive off the tramming clutch shaft, see photo (3). No bearing failure has been reported due to faulty lubrication since the original installation was made in 1944.

IN A COAL CLEANING PLANT . . .



This plant has 457 bearings to be lubricated, 27 of which are located on four sets of shakers. Two of the injector manifolds are illustrated, see photos (1) and (2). Over one and one-half million tons of coal passed over these shakers since the Centro-Matic System was installed and no time has been lost because of bearing failure. The Lincoln lubricant pumps are powered by 6" air motors and pump lubricants direct from original 400-lb. refinery containers. System is time clock controlled and operates at predetermined intervals ranging from 3 to 60 minutes, see photo (3).

Engineering Service

Our lubrication engineers are ready to assist you in solving your lubricating equipment problems to help reduce your "per ton" cost. We invite you to make use of this service, which is offered without obligation. The coupon at right will bring a representative or complete information.

LINCOLN

Pioneer Builders of Engineered Lubricating Equipment

LINCOLN ENGINEERING CO., ST. LOUIS 20, MISSOURI

Gentlemen:

We would like to have your representative call ☐. Please send me complete information on Lincoln Centro-Matic Systems ☐.

Name_____

Title_____

Company_____

Address_____

City_____ State_____

CA 847-4

U. S. Bureau of Mines

CONSTANT VIGILANCE is the price of Safety

Bituminous maintains a comprehensive Safety Engineering Service for its policyholders. This service is designed to help save lives and to reduce the frequency and severity of accidents. Bituminous Safety Engineers are trained and equipped to conduct mine inspections regularly . . . to teach workers the importance of safety . . . to analyze mine hazards and to correct them by scientific methods.

Mine owners and operators who enjoy the sound protection and benefits of Bituminous Workmen's Compensation insurance know from first hand experience the true meaning of SECURITY WITH SERVICE.

Assets Over $16,000,000

BITUMINOUS CASUALTY CORPORATION
ROCK ISLAND ILLINOIS

30 years of service to the industry.

Trade Literature

AVAILABLE WITHOUT CHARGE ON REQUEST TO THE MANUFACTURER

Coal Dryer — McNally-Pittsburg Mfg. Co., Pittsburg, Kan. Bulletin No. 301 provides complete technical information on the McNally-Vissac thermal dryer, now available in eight model sizes. Cutaway sections illustrate the mechanical and thermal-drying operation.

Fire Extinguishers—Randolph Laboratories, Inc., 8 East Kinzie St., Chicago. Handy selector-guide instantly presents important facts about the suitability, maintenance and performance of soda-acid, foam, pump-tank, dry-powder, loaded-stream, carbon-tetrachloride and carbon-dioxide fire extinguishers. Reverse side of the Data Guide tells, in relation to plant fire hazards, how high units should be bracketed, maximum distances of the extinguishers from the operator and the area protected by each unit.

Synthetic-Rubber Insulation — Simplex Wire & Cable Co., 79 Sidney St., Cambridge 39, Mass. Booklet, "Our Third Report to Industry," answers "What will happen to synthetic rubbers now?"—"Are they as good as the natural rubbers we knew before the war?"—"When do you think you will go back to natural rubber?" —and many other questions of this nature.

Spotlight—Koehler Mfg. Co., Marlboro, Mass. Catalog sheet describes construction and operation of the new and improved Wheat rechargeable spotlight.

Lubricants—Sun Oil Co., Philadelphia 3, Pa. Folder lists and describes the most important Sun products available for industry and serves as a quick reference to the uses and characteristics of Sun industrial products.

Welding Rods—All-State Welding Alloys Co., Inc., 96 West Post Road, White Plains, N. Y. Booklet describes savings resulting from the use of low-temperature welding and serves as a catalog and instruction guide for the All-State line, which includes rods especially designed for work on cast iron, steel, stainless steel, copper, copper nickel, nickel bronze and other copper-bearing alloys, zinc-base die castings and aluminum as well as a galvanizing powder for cast iron and a powdered brazing compound and fluxes.

Protective Clothing—B. F. Goodrich Co., Akron, Ohio. Booklet lists the new products introduced in recent months, illustrates and describes each garment and the method of construction and materials used.

Lamp Bulbs—Lustra Corp. of America, New York 10. Bulletin No. 103 describes four types of light bulbs especially designed for severe-duty industrial service as follows: vibration-service lamps with all-flexible construction, rough-service lamps with flexible 12-anchor filament mounts, mill-type lamps

FOR SAFETY'S SAKE, SUPERIOR COUPLINGS

Drop Forged Links

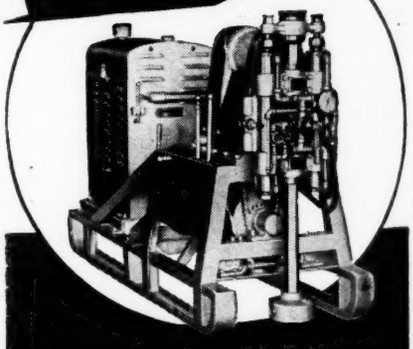
Drop forged for strength, Superior Swivel and Single Link Couplings are built to stand the gaff. No welds to let go with resulting wrecks. Superior Couplings on your mine cars will prevent accidents and reduce haulage costs. Order Superior Couplings for your replacements and specify them on new equipment.

DROP FORGED SWIVEL COUPLINGS

PITTSBURGH KNIFE & FORGE CO.

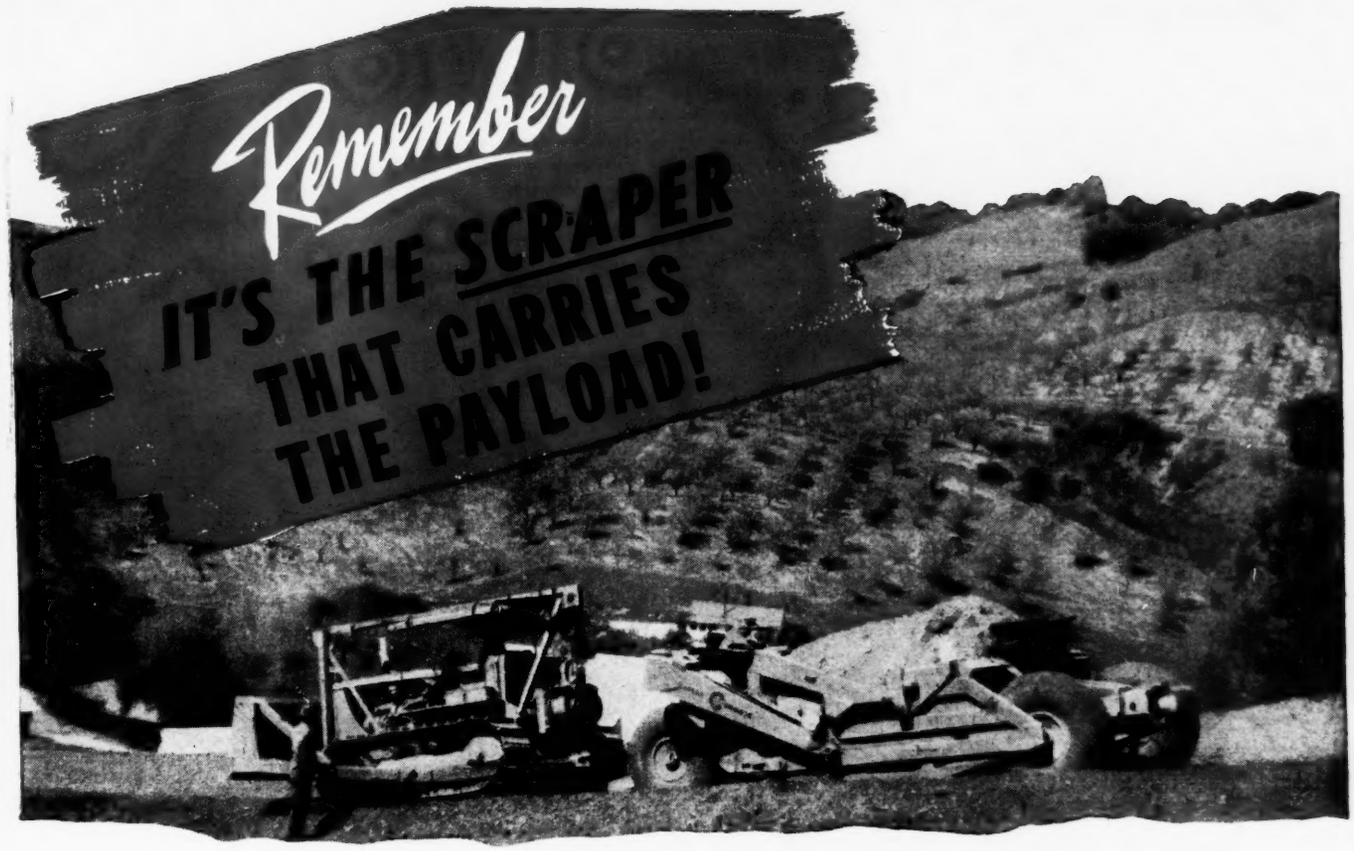
1421 Reedsdale St., N.S. Pittsburgh 12, Pa.

Diamond Core Drilling CONTRACTORS



Testing mineral properties with our light gasoline drills. SATISFACTORY COAL CORES GUARANTEED. Ground solidification by our pre-pressure grouting method for shafts. Wet mine areas, horizontal holes for drainage. Electric drills for inside mine drilling.

MOTT CORE DRILLING CO.
HUNTINGTON • WEST VIRGINIA



. . . AND COMPETITIVE TESTS PROVE THAT LaPLANT-CHOATE SCRAPERS DO THE BEST JOB UNDER THE MOST CONDITIONS!

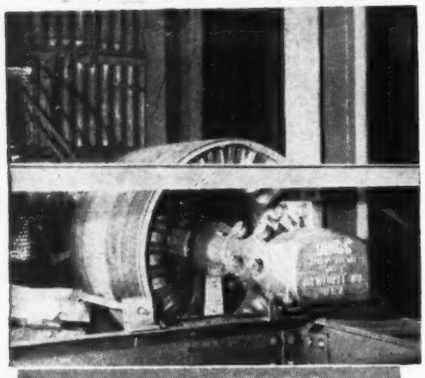
In the final analysis, *any make* of crawler tractor with sufficient horse-power will do a reasonably good job of handling a scraper. But when it comes to selecting *the right scraper*, it's an entirely different story. Some scraper outfits get heaping loads in double-quick time. Others take much longer — even with the aid of a pusher. Some will dump or carry a smooth spread in high gear, while others are slow and uncertain—especially in wet or bulky materials. Some scrapers make efficient use of tractor power — others burn it up by lugging around "an extra yard of dead-weight" that is strictly an extra cost item. The point is—regardless of what tractor you use, there's *a whale of a difference in scraper performance.* And that difference in the scraper alone can have an important bearing on your stripping or material handling costs. That's why more and more smart operators are picking up whatever tractors they can get—and standing pat on LaPlant-Choate Positive Forced Ejection Scrapers. Why LPC? Because competitive tests prove that under the varying conditions of scraper operation, La-Plant-Choate's improved rigs consistently deliver *highest average production at lowest over-all cost.* Just ask any recent LaPlant-Choate owner. LaPlant-Choate Manufacturing Co. Inc., Cedar Rapids, Iowa; 1022 77th Ave., Oakland, Calif.

LaPLANT-CHOATE

Positive FORCED EJECTION SCRAPERS

FIRST in value because they're **FIRST** in performance

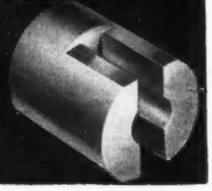
Protection Against TRAMP IRON for YOU and YOUR CUSTOMERS



with DINGS Magnetic Pulleys

Protect both your own coal handling equipment and your customer's stokers by installing a powerful Dings Magnetic Pulley to eliminate tramp iron before it can cause expensive damage. Separation is automatic and positive . . . Operating and maintenance cost about a penny a day, depending on pulley size . . . Some operators report "no cost" tramp iron protection because the sale of scrap removed more than pays for depreciation charges and operating expense! Size for size there are no more powerful magnetic pulleys built than Dings. Get full details from Dings today.

NEW! DINGS Magnetic Drill Extractor



A powerful Alnico Magnetic Drill Extractor to save redrilling blast holes when drill rod or bits break off in the hole. Dings Extractors lift up to 25 times their own weight ... Easy to use ... Can be carried in a pocket ... Write for data sheet containing complete information.

DINGS MAGNETIC SEPARATOR CO.
506 E. Smith Street, Milwaukee 7, Wisc.

Dings
"HIGH INTENSITY"

with all-wire shock-absorbing filament supports and traffic signal lamps.

Steel Pipe—American Iron & Steel Institute, New York 1. "Pipe in American Life," a 48-page illustrated booklet, presents the historical background and modern uses of metal pipe, with emphasis on the use of steel pipe. Chapters are devoted to the uses of steel pipe in homes, large buildings, farms and various industries.

Sludge Pumps—Barrett, Haentjens & Co., Hazleton, Pa. Bulletin describes the construction, properties and performance of its C-T and C-M sludge pumps for handling highly abrasive materials.

Drills—Hardsocg Mfg. Co., Ottumwa, Iowa. Folder illustrates the Hardsocg hydraulic horizontal and vertical drills and provides details of construction and operation.

Renewable Fuses—Trico Fuse Mfg. Co., Milwaukee 12, Wis. Folder No. 206-A details the construction and advantages of the company's "powder-packed" renewable fuses.

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Industrial Notes

Mack Mfg. Corp., New York, has elected A. C. Fetzer, vice president, to its board of directors. Mr. Fetzer, who was acting general sales manager, also was appointed general sales manager.

The Okonite Co., Passaic, N. J., has named R. S. Keefer, formerly sales manager, vice president in charge of sales, to supervise all sales activities of the company, its Hazard Insulated Wire Works Division and its affiliate, The Okonite-Callender Cable Co., Inc.

Robins Conveyors Division, Hewitt-Robins Inc., Passaic, N. J., has promoted R. U. Jackson, formerly manager of the Charleston, W. Va., office, to the position of coordinator of mine-conveyor sales. J. W. Wantling, the inventor of the Eliptex dewatering screen, succeeds Mr. Jackson as manager of the Charleston office.

John Flocker & Co., one of Pittsburgh's oldest commercial enterprises, is celebrating in 1947 the 125th anniversary of its establishment. River transportation and railroad facilities were primitive in 1822 when the Flockers built their rope mill on the Allegheny River not far from the village of Pittsburgh, at the present site of Blawnix, Pa. The mill prospered with the great Westward movement of commerce and industry, and when the mill was destroyed by fire, the company moved to Water St., the downtown shipping center, and acted as jobbers for the cordage mills on the Eastern seaboard, the prime function today of the Flocker Co. at its modern premises on Grant St.

John Flocker left the business to his family at his death in 1890. The present management is headed by Robert R. Irwin, who purchased the interests of the

COOL CAPS FEATURE . . . . .

Comfortable, Sanitary, Replaceable Sweatbands

More comfort, greater safety, and longer wear are now possible with replaceable sweatbands in COOL CAPS. They're easy to remove, easy to replace and are available in smooth leather or fabricoid material.

Vulcanized fibre COOL CAPS have always meant protection *plus* to veteran miners who know how important it is to keep their heads protected. Years of experience with COOL CAPS have taught these men that the best protected head is the Cool Capped head.

Write for full information about COOL CAPS with replaceable sweatbands.

Portable Safety Division
PORTABLE
PRODUCTS CORPORATION
424 Blvd. of the Allies, Pittsburgh, Pa.

TABLE OF CONTENTS
COMFORT . . .
COURTESY . . .
CONVENIENCE . . .
in ST. LOUIS
HOTEL Mayfair

The Rock-Drilling Record

LE ROI COMPANY

FEBRUARY, 1947

VOL. I.

LE ROI COMPANY ACQUIRES CLEVELAND ROCK DRILL CO.

Nation-wide Service Facilities

New Era of Highway and Public Works Construction Forecast

Le Roi's Cleveland Division meets the challenge by designing and producing a line of easier-holding, faster-drilling, more dependable machines that greatly reduce rock-drilling costs.

New Rock-Drilling Combination Reduces Costs

Popular AIRMASTER series of portable Compressors now teamed with a complete line of hard-hitting, fast-drilling tools.

Contractors can look forward to lower drilling costs with the union of Le Roi compressor efficiencies and Cleveland drilling performance.

AIRMASTER Compressors range in size from 60 to 500 cfm. There is a choice of gasoline or diesel power in all models, except the 60 ... this it

Quarry Production Up

Increased demand for stone met by wise use of modern rock-drilling equipment. Unusual flexibility of Cleveland wagon drill responsible for establishing new daily footage records. Ample po...

Production of Critically Needed Lead Aided by Cleveland Rock Drills

Rotation strength, easy-holding and dependability of these tools key factors in increasing tonnage per miner. The men say that they like to use Cleveland Drills. Reports show that miners drill more feet of hole and are less tired at the end of the shift.

Utilities Speed Repair Work with Air Tools

Equipped with mobile, truck-mounted Le Roi AIRMASTER compressors, crews rush out to repair the ravages of winter weather. Using hard-hitting Cle...

LE ROI MILWAUKEE

A leader in portable air power and a leader in rock-drilling equipment join to give you new standards of rock-drill service and performance

Service

We are emphasizing prompt, efficient service because it is a basic Le Roi policy. It is so important to us that no one holds a Le Roi franchise who doesn't conform to our rigid requirements. Nation-wide, Le Roi service is handled by well-trained, experienced, and competent men. All service outlets are conveniently located to assure you of speedy attention.

Performance

Users tell us that the AIRMASTER line of compressors is portable air power at its best. These fine compressors are now teamed with the well-known line of popular, fast-drilling Cleveland rock drills. For example, the 55-lb. H-111 hand-held drill, thanks to a happy combination of high drilling speed, dependability, and easy holding, is hard to beat. The Cleveland wagon drill establishes new drilling records almost everywhere that it is put to work — unusual flexibility and the power to drill deep holes are mainly responsible. Mines, with the job of producing metals critically needed in our economy, call on Cleveland drills to help step up their tonnages.

The Future

Le Roi and Cleveland Rock Drill are now one — this includes all Cleveland's basic patents and all patents pending. Cleveland and Le Roi designers and metallurgists are all members of the same family. To rock drill users, this combination of talent and experience means, in addition to new standards of service, future developments that will further serve to reduce drilling costs.

LE ROI COMPANY

Cleveland Division

Manufacturers of Cleveland Rock Drills

CLEVELAND 11, OHIO

LE ROI COMPANY, *General Offices*, Milwaukee 14, Wis.

New York • Washington • Cleveland • Milwaukee
Birmingham • Tulsa • Butte • San Francisco

A SAFETY HOOK
that's as
EASY TO USE
as a risky one

Since Laughlin's newly-designed latch provides approximately 80% of the throat opening of ordinary hoist hooks, more and more materials handlers are swinging over to the safe side.

You, too, can add safety to efficiency by making loads jolt-proof. Investigate these rugged, drop-forged, heat-treated, standard-type hoist hooks with sturdy latches and stainless steel springs (½ to 15 ton safe load).

THE LAUGHLIN HOOK LINE

Laughlin has the most complete line of hooks: grab hooks, hoist hooks, cargo hooks and others. All are heat-treated, drop-forged and weldless.

Distributed through mill, mine, and oil field supply houses. For catalog, write Dept. 6, The Thomas Laughlin Company, Portland 6, Maine.

LAUGHLIN

THE MOST COMPLETE LINE OF DROP-FORGED WIRE ROPE AND CHAIN FITTINGS

Flocker heirs on Jan. 1, 1937. Today the company's products of manufacture and distribution include fibre and wire ropes and slings, twines, packings, cordage specialties for industrial and marine use, and brattice cloth for mine ventilation.

Fairbanks, Morse & Co., Chicago, has named John S. King manager of its Chicago branch, succeeding Frank V. Roy, associated with the company since 1908, who retires March 1. Mr. King has had a wide experience with the company and most recently was assistant manager of its railroad division.

Union Wire Rope Corp., Kansas City, Mo., has appointed Charles M. Zerr, for the past 12 years assistant to Walter Voightlander, chief engineer of the rope division. Other advancements in the enlargement of Union Wire Rope's technical service include Raymond O. Kasten as assistant technical director, Robert C. Downey, research chemical engineer, Omer Brenton, assistant metallurgist and Dwain L. Bedford, metallurgist in charge of the chemical, physical and metallurgical functions of the laboratory.

Heyl & Patterson, Inc., Pittsburgh, has appointed F. W. Niggemyer to its sales department. During his three years in the Navy Mr. Niggemyer received the Presidential Citation and 12 battle stars while serving as fire-control officer aboard the aircraft carrier Essex. Prior to joining Heyl & Patterson he was associated with the Electric Controller & Mfg. Co.

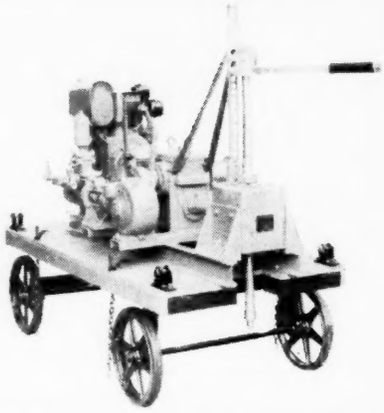
Hercules Powder Co., Wilmington, Del., has named Ernest S. Wilson, formerly chief engineer, director of its engineering department, succeeding Luke H. Sperry, retired after 31 years' service with the company. Ray N. Wheelock, assistant chief engineer, has been appointed assistant director.

Lima Locomotive Works, Inc., Shovel and Crane Division, Lima, Ohio, has named J. W. Artz director of parts sales and service. Mr. Artz has been associated with Lima since 1928 as parts sales and service manager. Howard W. Read, formerly assistant parts sales and service manager, has been appointed parts sales manager, and William D. Lutes, assistant parts sales manager. T. A. Griffin, formerly service engineer, has been named service manager of the Shovel and Crane division.

Hendrick Mfg. Co., Carbondale, Pa., has appointed as sales representatives, A. H. Patten, head of Patten Engr. Co., Denver, to cover Colorado, Utah, Wyoming, Montana and Southern Idaho; Fred G. Greaves Co., Seattle, to handle Washington, Oregon and Northern Idaho; and Orville B. Ackerly Jr., San Francisco, for Northern California and the Reno section of Nevada.

Babcock & Wilcox Co., New York, has announced a program of expanded research in a building on a 20-acre site purchased near Alliance, Ohio, from the Buffalo Weaving & Belting Company. All the research activities of the company, now

CORE DRILLS



- Accurate cores of coal seams by using single or double tube core barrels.
- Ideal for determining overburden before strip mining.
- Diamond—alloy or steel shot bits.
- Light weight—easy to move in rough country.

SEND FOR BULLETINS

ACKER DRILL CO.
SCRANTON 3, PA.

SIGN OF QUALITY
MARLO
PACKING
for
MINE PUMPS
Resists acid mine waters. Keeps grit out of stuffing box. Three types.

• **MARLO ALL PURPOSE METALLIC PACKING**
Best ever devised. Will not freeze at 70° below, soft, pliant, like fibrous types, yet easier to handle. Won't cut, score or corrode moving parts.

• **"TWIN-TWIST" SEMI-METALLIC PACKING**
Metal strands twisted with asbestos. Anti-frictional. Durable. Economical. Remarkable compressibility. Never hardens. For temperature up to 550° F.

• **"RED WATER" SEMI-METALLIC PACKING**
Most modern development for all hydraulic applications. A solid-packing vegetable fibre combined with metal strands. Retains form under any conditions.

THE MARLO COMPANY
38 HOWARD ST.
NEW YORK, N. Y., U. S. A.

MANHATTAN CONVEYOR BELTS are Built to Last . . .

Wherever production requires efficient moving of material, belt conveyors do the job most economically. Whenever production is impaired by break-downs of conveyor belts, many mine and quarry operators call on Manhattan. For more than 50 years Manhattan engineers have been solving troublesome conveyor belt problems and incorporating new and unusual features in Manhattan engineered belts for difficult jobs.

In developing the best rubber belts for conveyors, Manhattan engineers have combined scientifically compounded Flexlastics with specially designed Strength Members in the belt body, to make Manhattan Conveyor Belts stronger, longer lasting, yet more flexible around end pulleys and in troughing idlers.

The Manhattan 54" Conveyor Belt designed for the huge traveling stacker shown above, was built to deliver 800 tons of overburden per hour on a 190' boom. Baked by summer sun, glazed by winter ice, it stands the gaff the year around, as do all Manhattan belts.

All Manhattan Conveyor Belts are mildew-proofed. Oil-proof belts are also available.

Look into the engineered Homocord construction and other Manhattan features that consistently show "lower costs per ton" on service record cards.

The term Flexlastics is an exclusive Manhattan Trade Mark. Only Manhattan may make Flexlastics

ANHATTAN Condor PRODUCTS

Mines, Quarries and Construction Jobs

- ...m, Water Hose
- ... Hose
- ...
- ... Hose
- ...p Hose
- ...ion Belting
- ...
- ...r Belts
- ...Belts
- ...d Launder Lining
- Engineered Molded Products
- Mine Trolley Wire Guard
- Flexible Rubber Pipe
- Rubber-Lined Pipe
- Vibration Dampeners
- Brake Blocks and Lining, Clutch Facings
- Abrasive Cutting and Surfacing Wheels

RAYBESTOS-MANHATTAN, INC.

MANHATTAN RUBBER DIVISION

EXECUTIVE OFFICES AND FACTORIES — PASSAIC, NEW JERSEY

carried on at its plants, eventually will be centered in the new research development, under the direction of Leslie S. Wilcoxson, vice president in charge of research and development.

United Engineers & Constructors, Inc., Philadelphia, has elected Edward L. Keenan vice president and purchasing agent. Mr. Keenan has been purchasing agent for the company since 1928.

Allis-Chalmers Mfg. Co., Milwaukee, has appointed Paul R. Pollock, associated with the company since 1936, manager of its Denver, Colo., office, succeeding Henry H. Roth, transferred to generator sales of the motor-generator sales section of the electrical department at the company's main works in West Allis, Wis.

Exploration Drilling Co., Inc., Huntington, W. Va., has been formed with S. E. Wiseman, C. V. Sweeney, O. F. Harper and W. D. Anderson as incorporators, and is now accepting drilling contracts.

Simplex Wire & Cable Co., Cambridge, Mass., has appointed W. W. Lancaster as sales representative in the States of Mississippi, Louisiana, Arkansas, and western Tennessee.

Carbozite Protective Coatings, Inc., formerly known as Carbozite Cos., has moved from Pittsburgh, Pa., to the company's plant at 811 South Main St., Greensburg, Pa. Officers of the company will continue to serve in their present capacities.

Jenkins Bros. has appointed James M. Martin manager of its Philadelphia branch, succeeding Joseph E. Hodgkins, retired, who joined Jenkins Bros. in 1898. Mr. Martin, formerly assistant manager of the branch, has been with the firm since 1917.

R. G. LeTourneau, Inc., Peoria, Ill., has appointed Robert C. Judd market research manager. Before joining LeTourneau, Mr. Judd conducted his own sales research firm.

B. F. Goodrich Co., Akron, Ohio, has established a new district office for its industrial products sales division in Cincinnati and has appointed John S. Gulledge district manager. Mr. Gulledge joined the company in 1923 and since returning from war service has served as acting manager of the Denver district and on special assignments for the industrial products sales division.

Jones & Laughlin Steel Corp., Pittsburgh, has appointed W. P. Getty, formerly assistant to general manager of raw materials, assistant general manager of raw materials. M. E. Fry has been named assistant to general manager of raw materials. Mr. Fry is also assistant to the president of the various raw-materials subsidiary companies.

Joy Mfg. Co., Pittsburgh, Pa., has named G. R. Splinder, formerly chief, West Virginia Department of Mines, consulting mining engineer in connection with its European operations.

Marion Power Shovel Co., Marion, Ohio, has elected Harvey T. Gracely president and general manager, succeeding M. E. Montrose. Mr. Gracely first became associated with the company in 1901 and has been general sales manager for the past 14 years. He was elected a vice president of the company in 1945.

Sun Oil Co., Philadelphia, has appointed Laurens H. Fritz, formerly associated with the Aitkin-Kynett Co., industrial advertising manager, succeeding John C. Fairchild, resigned.

Greene, Tweed & Co., North Wales, Pa., has named Howard C. Josephson, previously assistant to the president of Clark-Babbitt industries, general sales manager.

Davey Compressor Co., Kent, Ohio, has appointed Paul V. Goodman director of purchases.

Mines Safety Appliances Co., Pittsburgh, has announced that Dr. William P. Yant, director of research for the company, has been chosen the 1946 recipient of the Pittsburgh Award, bestowed annually for outstanding service to chemistry by the Pittsburgh section of the American Chemical Society. "Dr. Yant has contributed prolifically to science, industry and welfare," said Herbert E. Longenecker, dean of the Graduate School of the University of Pittsburgh and chairman of the section, in announcing the award. "Every activity of his has directly benefited humanity by improving health, reducing suffering and raising the general economic level."

Stearns Magnetic Mfg. Co., Milwaukee, has appointed Gordon E. Medlock assistant manager of sales and repairs for its brake division.

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Introducing–the New, Revolutionary KENNAMETAL PERCUSSION BIT for Pneumatic Jack Hammer Rock Drilling

It's the FIRST bit ever designed with a cemented carbide cutting edge that fulfills all practical requirements of pneumatic percussion rock drilling at the high air pressures (80 to 120 pounds per square inch) used in the United States.

KENNAMETAL—the cemented hard carbide that revolutionized steel-cutting, steel-milling, and cutting and drilling in coal and non-metallic mines—is now ready to produce equally outstanding results on pneumatic percussion drilling of hard rock formations. The chisel-type bits shown at the right have Kennametal cutting edges, and are so designed that best use is made of Kennametal's tremendous compressive strength and high resistance to abrasive wear.

These bits have been widely tested on granite, silica sand rock, hard limestone, and other hard rock substances. Service reports (of which the two at the right are typical) are remarkable—the Kennametal cutting edge successfully withstands the hammering of high air pressures . . . drills through hard rock formations with unprecedented speed . . . holds an effective cutting edge for greatly extended periods of drilling . . . and can be resharpened time and again! Furthermore, less compressed air is used, the periods of operation between bit changes are much longer, and the cost of bits per foot of hole drilled is greatly reduced.

Kennametal Percussion Bits are suitable for dry or wet drilling. When drilling dry holes the amount of heat generated has been found to be negligible. When wet drilling is done, water is supplied through the holes in the side bevels of the bit.

These bits are now being manufactured in two sizes; $1\frac{3}{8}$" costing from $8.10 to $9.70 each; and $1\frac{5}{8}$" costing $9.50 to $11.40 each depending upon quantity purchased.

KENNAMETAL

TRADEMARK REG. U. S. PAT. OFF.

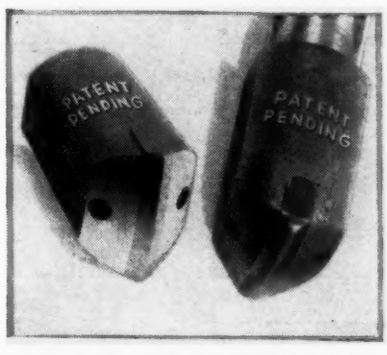
SUPERIOR CEMENTED CARBIDES

KENNAMETAL *Inc.*, LATROBE, PA.

Performance That Is Unequalled In The History of Percussion Drilling!

198 Feet of Holes Drilled in Hard Silica Sand Rock in 308 Minutes!

An unused Kennametal Percussion Bit (left) and at the right, one after it had drilled 198 feet, in 308 minutes *without being resharpened,* in hard silica sand rock which forms the roof of a Cambria County, Pa. coal mine. It took 188 steel bits 1210 minutes to drill the same footage. Kennametal Bits saved almost 15 hours! The 188 steel bits cost almost 5 times as much as the one Kennametal Bit, and were completely worn out. The Kennametal Bit can be resharpened, and is good for many more feet of drilling.



50 Feet of Holes Drilled in Barre Granite in 50 Minutes!

The used Kennametal Percussion Bit at the right above drilled 50 feet of holes, $1\frac{3}{8}$" in diameter, at the rate of one foot per minute, in solid Barre granite before being taken off the driving rod to be sharpened. Compare it with the unused Kennametal Bit shown at the left. In this same substance, a steel bit wore out after drilling only $1\frac{1}{2}$" inches.

Macwhyte Wire Ropes include. MACWHYTE PREformed and Non-PREformed Internally Lubricated Wire Ropes . . . MONARCH WHYTE STRAND Wire Rope . . . Special Traction Elevator Rope . . . Stainless Steel Wire Rope . . . Monel Metal Wire Rope . . . Galvanized Wire Rope. Macwhyte also makes Atlas Braided Wire Rope Slings, Hi-Fatigue Aircraft Cables, Assemblies, Tie-Rods. Catalogs on request.

a thousand and one...

MACWHYTE WIRE ROPES...

all job-proved . . . assure you the <u>correct</u> rope for your equipment

When you use the correct wire rope, both the rope and your equipment last longer, cost less to operate. Macwhyte consulting engineers will check your equipment and recommend the wire rope specifically engineered for your job. Ask your Macwhyte distributor, or write Macwhyte Company.

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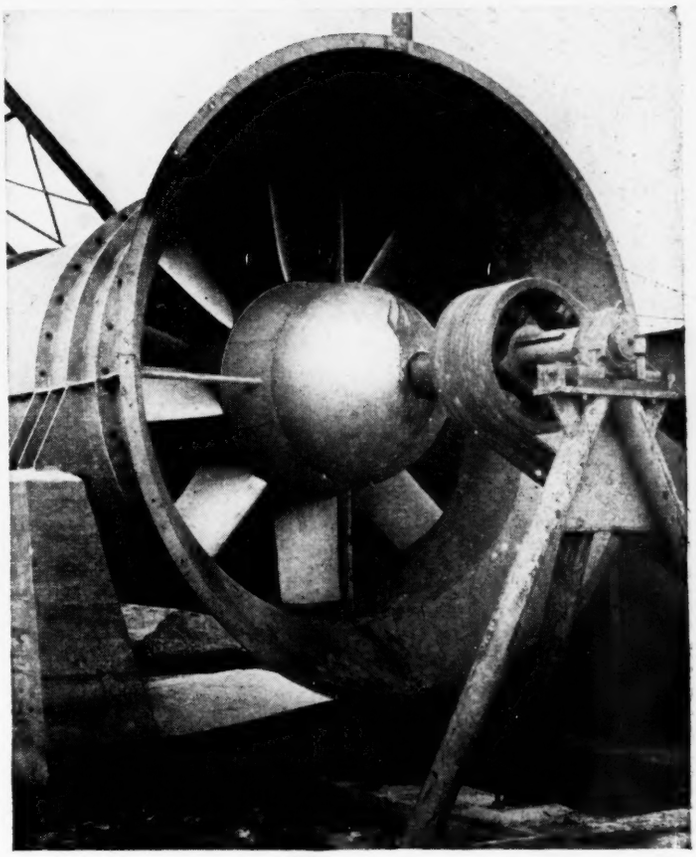
NO. 892

Make MACWHYTE your headquarters for WIRE ROPES

HELPING Miners Breathe

● *Built by The Jeffrey Mfg. Co.*

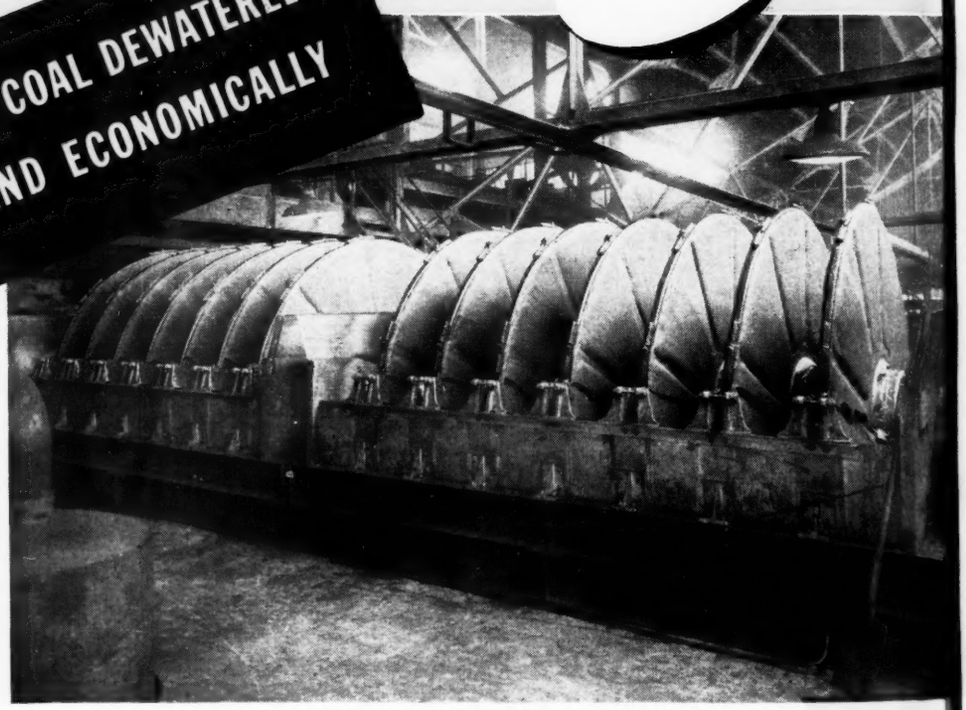


Pushing fresh air to men in mines is a job for *dependable* equipment. That's why this Jeffrey No. 8-H-96 Aerodyne Mine Fan—with its SKF Spherical Roller Bearings at vital points—is used. Regardless of the amount of horsepower or the number of r.p.m.'s required by this fan to provide adequate ventilation in a given area, SKF Bearings maintain full load carrying capacity . . . need only occasional lubrication for a long, useful life. Their *rolling alignment*, a pioneering feature of SKF, eliminates binding and compensates for shaft deflections, distortions or weave. Next time *you* need bearings for a tough job, use tough-job bearings—SKF. 6203

SKF INDUSTRIES, INC.
Front St. and Erie Ave., Phila. 32, Pa.

Why not do it THE AMERICAN WAY?

. . . IF YOU WANT COAL DEWATERED EFFICIENTLY AND ECONOMICALLY



The picture shows a typical installation of the American Vacuum Filter continuously dewatering coal. It's a high capacity installation.

Yes, the American Way is the economical and efficient way to dewater coal. Vacuum on each sector in the filter leaf easily picks up its load of coal and insures lower moisture content because of more rapid drainage than is possible by natural drainage. Coal is in better condition for shipment or further processing.

For certain sizes, continuous dewatering is definitely an advantageous step. Why not have one of our engineers check up on the advantages of installing an American Filter in your preparation plant?

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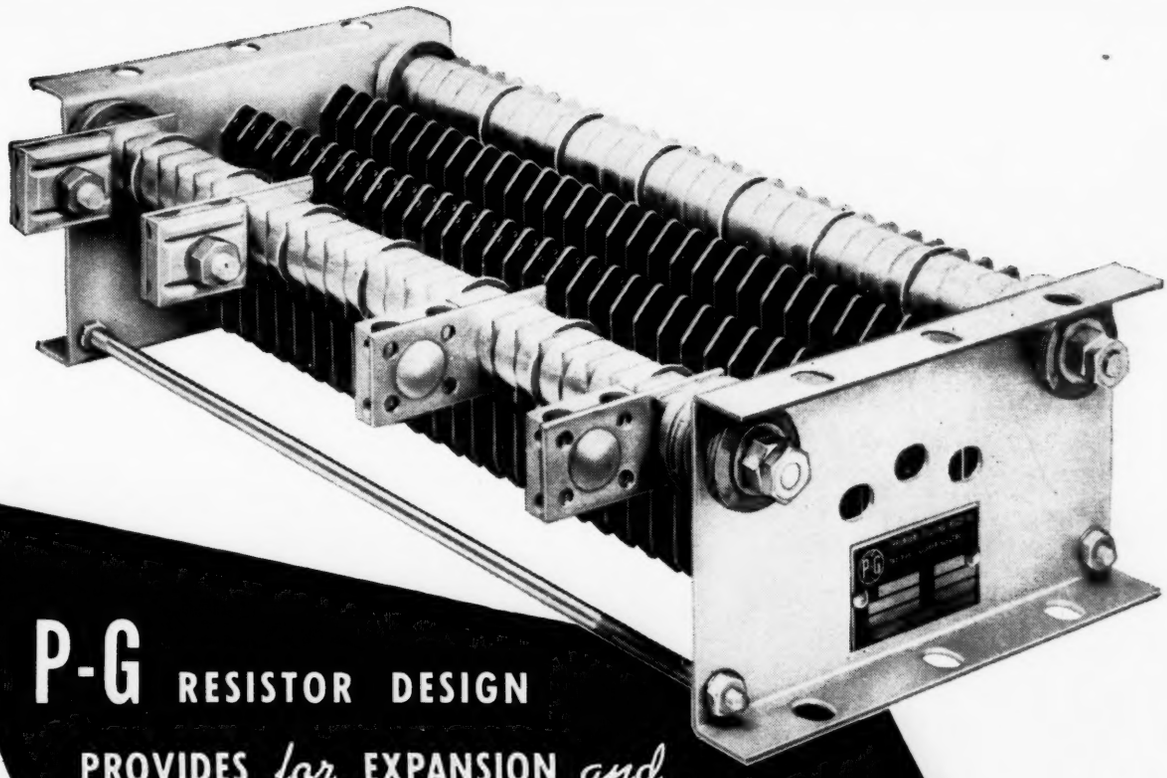
Factories: Oakland, Calif.—Hazleton, Pa.—Orillia, Canada—Melbourne, Australia



P-G RESISTOR DESIGN PROVIDES *for* EXPANSION *and* MAXIMUM VENTILATION . . . .

- ★ ALL STEEL CONSTRUCTION
- ★ MICA INSULATION
- ★ RUGGED TERMINALS
- ★ PROVISION FOR EXPANSION
- ★ ADEQUATE VENTILATION
- ★ UNAFFECTED BY VIBRATION
- ★ MOISTURE RESISTANT
- ★ CORROSION PROTECTED

• The exclusive "P-G Floating Bolt" construction permits the resistor element to expand without buckling as the temperature increases under load. Thus, damage from expansion or buckling . . . a frequent source of resistor trouble . . . is eliminated.

The unique shape of the "P-G Steel Grid" assures maximum ventilation because of the even heat distribution over the entire grid surface. Each part of the grid is equally exposed to air and the heat produced is rapidly dissipated.

These and many other practical features of design, plus steel and mica as basic materials, assure long resistor life.

Steel Grid Resistors
for COAL MINES
Since 1915

P-G

The Nonbreakable Steel Grid Resistor

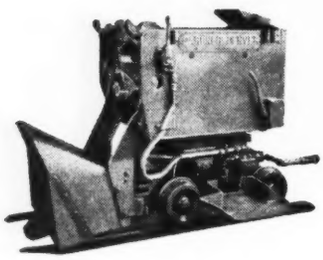
THE POST-GLOVER ELECTRIC COMPANY

• ESTABLISHED 1892 •

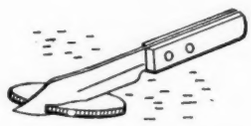
221 WEST THIRD STREET, CINCINNATI 2, OHIO

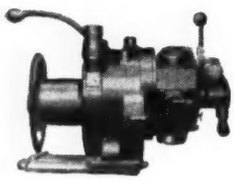
TONNAGE COST-CUTTERS

Whatever the character of your ground—whatever the size of your job, there's a Gardner-Denver hand-held drill to fit it! In any weight, you'll find the same powerful, four-pawl rotation—easy riding—efficient hole cleaning—low air consumption and ruggedness.

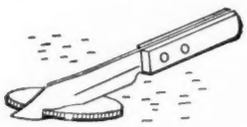


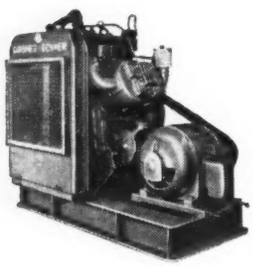
Load tons of rock in minutes with the Gardner-Denver GD14 Mine Car Loader! Powered by two 5-cylinder radial air motors, it crowds its dipper into your muck piles and discharges a full load every time. Various track gauges are accommodated by changing the wheels only.





This Gardner-Denver HB Single Drum Hoist is powered by a 5-cylinder radial air motor for even torque at all speeds. Has a vertical lift capacity of 1250 pounds at 80 pounds pressure. Due to the motor design, smaller over-all dimensions and less weight per horsepower are made possible.





Remarkably compact in size, Gardner-Denver "WB" two-stage vertical air compressors have efficiencies comparable to those of large horizontal compressors. Completely water-jacketed cylinder and head assure continuous full-load operation in any season—at any altitude.

For complete information, write Gardner-Denver Company, Quincy, Ill.

GARDNER-DENVER

SINCE 1859

WHEN ROCKBESTOS A.V.C. GOES IN

More and more mine operators and superintendents — with an eye on mounting costs — are insisting on Rockbestos A.V.C. Mining Cable to protect profits by keeping equipment in operation.

This cable, designed especially for the internal wiring of cutters, loaders and locomotives, has been top choice for more than 15 years with mining machine manufacturers and mine electricians. They prefer it because they *know* they can depend upon it for long service close to hot resistor grids and under heavy overloads without drying out, cracking or burning. They also *know* that its *impregnated asbestos insulation* won't rot out, swell or flow when exposed to oil and grease.

If you are not already taking advantage of the maintenance-reducing characteristics of Rockbestos A.V.C. write for Bulletin 30-C and a sample of the cable.

ROCKBESTOS PRODUCTS CORPORATION, P. O. BOX 1102, NEW HAVEN 4, CONN.

THE ORIGINAL ROCKBESTOS A. V. C. GIVES YOU THESE ADVANTAGES

It is made to fit bushings properly.

The impregnated asbestos yarn braid is heatproof, flameproof and resistant to moisture, oil, grease and alkalies.

The felted asbestos insulation beneath, impregnated with heat, flame, and moisture resisting compounds like the braid, won't bake out, crack, flow or burn.

Asbestos-protected varnished cambric supplies high dielectric strength and added moisture resistance.

The inner impregnated asbestos insulating wall won't get brittle or crack under conductor-heating overloads and won't burn even if the copper melts.

The paper separator prevents the insulation from sticking to the conductor and makes stripping easy.

This construction is one of 125 developed by Rockbestos for severe operating conditions.

ROCKBESTOS A.V.C. — **The Cable with Permanent Insulation**

ORDER FROM THESE JOBBERS — SPECIFY "ROCKBESTOS" A.V.C.

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TWO OUTSTANDING PERMISSIBLE DRILLS

from the world's largest line of electric coal drills

112 holes in 14 hours

Drilling speed up to 40" a minute

The CP No. 574 Permissible Post-Mounted Coal Drill, with a drilling speed up to 40 inches per minute, is easily capable of drilling 40 to 60 holes per shift. The rugged motor, which will stand up under most difficult drilling conditions, complies with all requirements of the U.S. Bureau of Mines, and carries the Bureau's permissible name plate. A drill that is economical to operate and low in maintenance.

CP No. 572 Permissible Hand-Held Coal Drills, with safety clutch, working in the difficult Alma seam, drill 112 holes, 2¼" diameter by 7 feet deep, each day of two seven-hour shifts. The safety clutch, for release in case the auger sticks, is a valuable protective feature for the operators and motor.

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General Offices: 8 East 44th Street, New York 17, N. Y.

PNEUMATIC TOOLS • AIR COMPRESSORS • ELECTRIC TOOLS • DIESEL ENGINES
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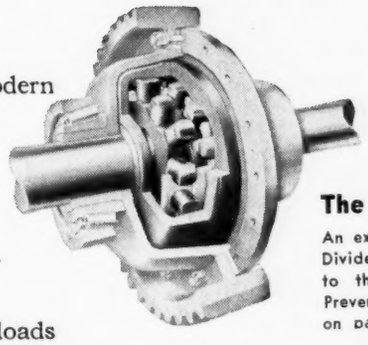
A 15-TON DUMPER

that's keeping shovels busy!

Take a look at the new Mack LR Model . . . a modern dump truck that keeps shovels hustling wherever it goes to work. Yardage . . . performance . . . dependability . . . economy . . . all yours with this big, fast and powerful dumper. It's Mack-designed and Mack-built—from its staunch all-welded frame to its comfortable cab and seat—to handle 15-ton payloads.



The Mack Power Divider

An exclusive and outstanding feature! The Power Divider is a differential which transmits torque to the wheel maintaining the most traction. Prevents wheel fight, tire wear, and over-stress on parts.

This Mack is more than a match for tremendous loads to be moved remote from highways. Air-operated clutch, power steering, the Mack Power Divider and massive, air-actuated brakes enable the driver to maintain positive control of vehicle under all pit conditions. Wide front axle and short-wheelbase permit turns in a 55' 4" radius.

Available as a Tractor, Too!

The LR chassis is also adapted as a tractor to haul a 30-ton trailer load or handle rigging work. In addition, Mack builds both smaller and larger off-highway models that can be counted on to serve dependably and save money in use.

Safety features include the cab offset to the left—with wide, clear vision to the rear as well as forward. Everything you'd expect in a new Mack product you will find built into this dumper. 47 years' heavy-duty experience enables Mack to build 'em better *to do your work better.*

Mack TRUCKS FOR EVERY PURPOSE

PERFORMANCE COUNTS!

Mack Trucks, Inc., Empire State Building, New York 1, New York. Factories at Allentown, Pa.; Plainfield, N. J.; New Brunswick, N. J.; Long Island City, N. Y. Factory branches and dealers in all principal cities for service and parts. In Canada, Mack Trucks of Canada Ltd.

FULTON BAG & COTTON MILLS, Inc.

Since 1870

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ATLANTA	ST. LOUIS	NEW ORLEANS	DENVER
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THE PROVEN

NON-INFLAMMABLE JUTE BRATTICE CLOTH

AN INTEGRAL ELEMENT IN SAFE MINE VENTILATION

Close Woven Jute Fabric with the Famous F F F F Non-Inflammable Treatment Which Is Mildew, Fungus and Dry Rot Resisting

F F F F's *Lasting Qualities and Economy Are Time-Proven*

TWO WEIGHTS—ALL WIDTHS

F F F F No. 8 EXTRA HEAVY BRATTICE MADE FROM SPECIAL QUALITY JUTE FABRIC IMPREGNATED WITH THE PROVEN F F F F TREATMENT. Especially Recommended for Gaseous Mines.

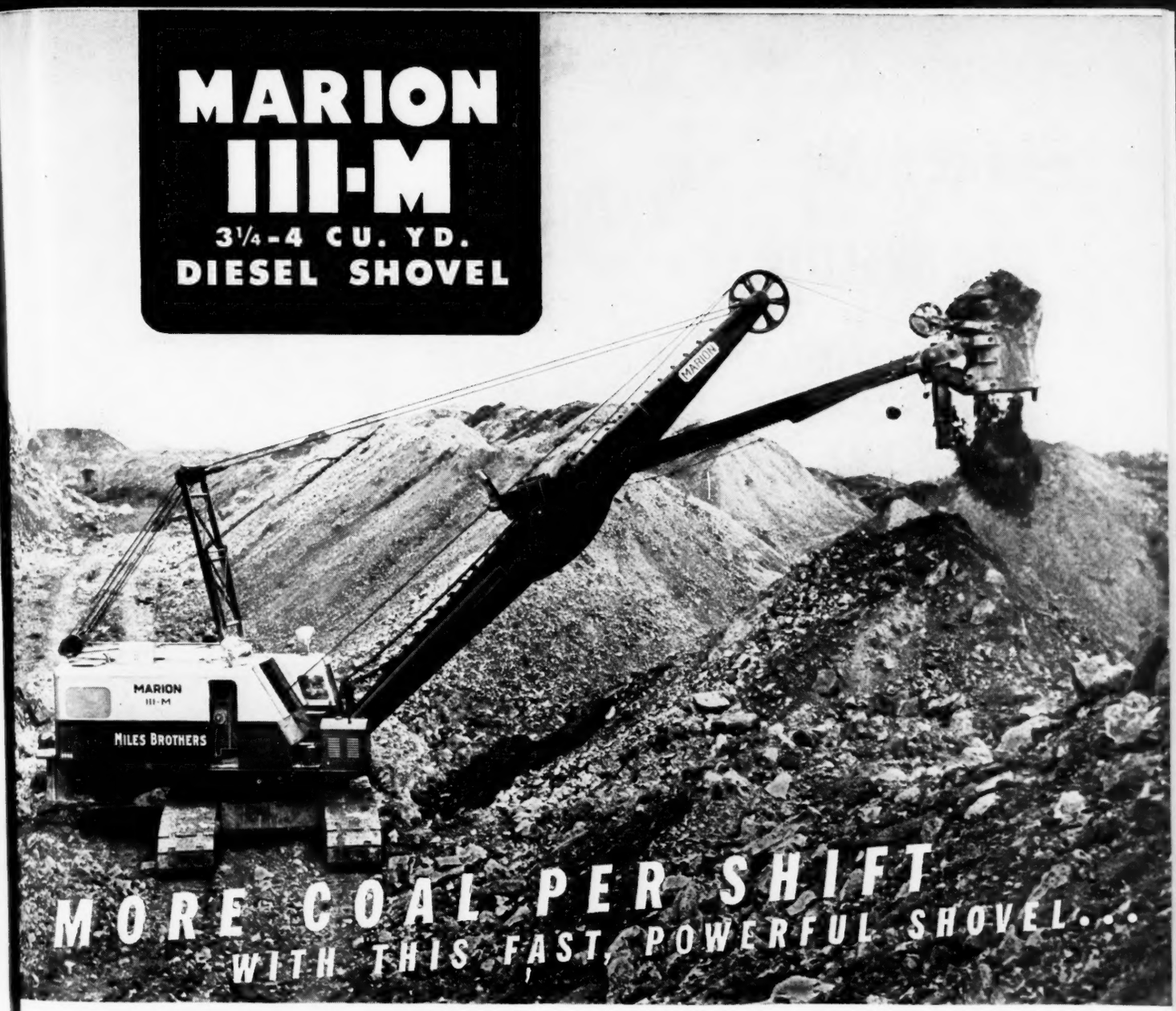
F F F F No. 155 STANDARD WEIGHT BRATTICE MADE FROM SELECTED JUTE FABRIC IMPREGNATED WITH THE PROVEN F F F F TREATMENT. Recommended for use in Non-gaseous Mines.

IMMEDIATE SHIPMENT

From Stocks by Leading Distributors in All Mining Areas

or Direct from Factory

MARION
111-M
3¼-4 CU. YD.
DIESEL SHOVEL



MORE COAL PER SHIFT
WITH THIS FAST, POWERFUL SHOVEL...

HERE ARE A FEW OF THE
111-M FEATURES

Balanced design and construction.

•

Long, wide crawlers reduce bearing pressure.

•

All-welded construction of upper and lower frames.

•

All operations are controlled by air which does ALL OF THE WORK.

•

Straight line power reduces friction losses to a minimum.

•

Readily convertible into dragline, clamshell, and crane.

•

Ships without major dismantling.

The MARION 111-M is a heavy-duty, all-purpose machine that introduces a greater degree of flexibility to coal strip mining. The 111-M is equally as efficient in stripping overburden as it is in digging and loading coal because it has the stability, low bearing pressure, speed, and maneuverability so essential for big results in all types of digging and under all kinds of conditions. It will pay you to check the 111-M in action.

MARION
POWER SHOVEL COMPANY
MARION, OHIO, U. S. A.

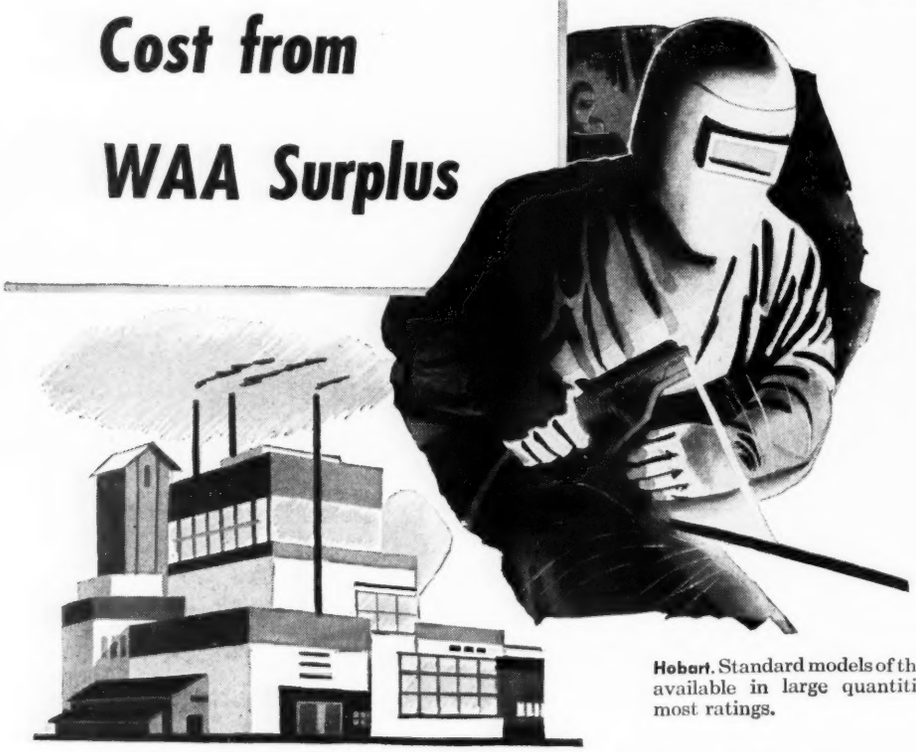
Offices and Warehouses in all Principal Cities

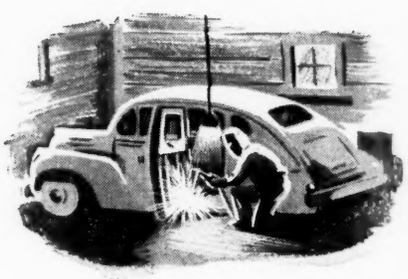
HERE'S AN ARC WELDER FOR YOUR SHOP—*At Minimum Cost from WAA Surplus*

Here are hundreds of arc welders available for immediate delivery. At WAA's low prices, no shop, however small, need be without a welder. And no shop is too big to fill its requirements from this large stock.

These are standard makes, the products of recognized manufacturers—in demand by garages, repair shops and maintenance shops and many production lines. Act today. Visit, phone or write your nearest WAA Regional Office for complete information on the availability and price of the machine you want.

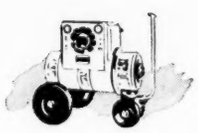
All arc welders are offered subject to prior sale.



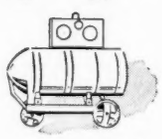


All Arc Welders are subject to priority regulations. VETERANS OF WORLD WAR II are invited to be certified at the War Assets Administration Certifying Office serving their area and then to purchase the material offered herein.

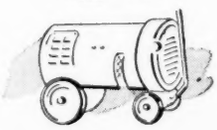
Exporters: Your business is solicited. If sales are conducted at various levels, you will be considered as a wholesaler. Any inquiries regarding export control should be referred to Office of International Trade, Department of Commerce, Washington, D. C.



Hobart. Standard models of this make available in large quantities and most ratings.



Lincoln. In all models and most ratings. Many in the popular 300-400 Ampere size.



Westinghouse. Portable models available in limited quantities. Electrodes and Welding Rods. Millions of pounds available in all types and sizes.

886

WAR ASSETS ADMINISTRATION

GOVERNMENT OWNED SURPLUS

Offices located at: Atlanta • Birmingham • Boston • Charlotte • Chicago Cincinnati • Cleveland • Dallas Denver • Detroit • Fort Worth • Helena Houston • Jacksonville • Kansas City, Mo. • Little Rock • Los Angeles Louisville • Minneapolis • Nashville New Orleans • New York • Omaha Philadelphia • Portland, Ore. • Richmond • St. Louis • SaltLake City San Antonio • San Francisco • Seattle Spokane • Tulsa

Heat-treated gears are used in this transmission and spur gear reductions, with an ample factor of safety for the operation of machine under all conditions. Link-Belt bearings of extra size are used throughout. Augers are connected to main-drive shaft through a self-aligning chuck of ample size, in which is secured the drive shaft by two shear pins which provide sufficient safety to rest of machine. The machine is raised or lowered to a height of 36 inches by jacks on front of machine, and rear of machine is mounted on two pneumatic-tired wheels which also have a 36-inch range of adjustments. The machine permits the drilling of a controlled-angle hole, which makes possible a great saving in the use of explosives through the cantilever effect of this controlled-angle drilled hole.

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MECHANICAL FEED HORIZONTAL DRILL.

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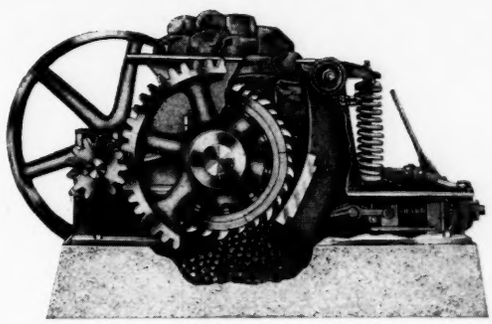
McLANAHAN BLACK DIAMOND CRUSHER

• With Automatic Steelstrut Toggle and Quick Adjustment

DEPENDABLE — ECONOMICAL



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Built for "peak" production under difficult working conditions—McLanahan Black Diamond Crushers are doing an outstanding performance job for hundreds of important coal producers. For present needs or future modernization of your workings—call on McLanahan. Built in all capacities for any sized product required. Descriptive data on request.

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HOLLIDAYSBURG, PENNA.

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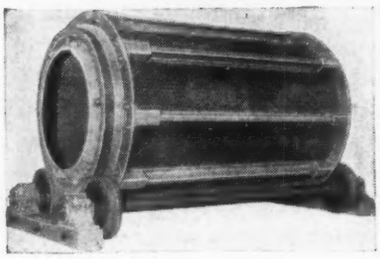

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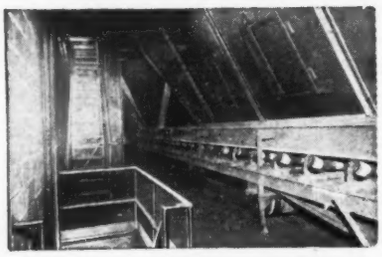
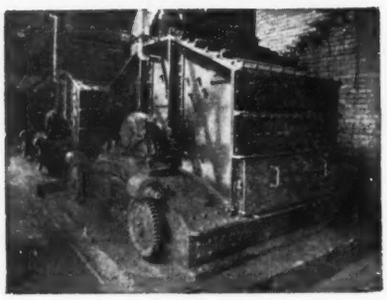
ROLLER-MOUNTED BRADFORD COAL BREAKER AND CLEANER, specialized for automatic refuse removal from shovel-loaded full seam coal, while sizing the good coal for cleaning.



"PENNSYLVANIA"

Bradford - Hammermills crushing, cleaning and delivering to Belt 1400 tons of prepared coal hourly, at one of the world's largest Generating Stations. Patented.



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REVERSIBLE HAMMERMILLS preparing Bradford-treated coking coals for By-Product Ovens—at the rate of 600 tons per hour. Patented.

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SLOW SPEED GRANULATOR preparing "Premium" Domestic Stoker Sizes at Mine. This advanced type is also widely used in Industrial Power Plants. Patented.

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Type K Single Roll Crusher — with automatic tramp iron protection — preparing commercial sizes at mine. Adjustable for 1" to 8" sizing without shut-down. Patented.

World-wide installations of these "Pennsylvania" STEELBUILT types, prepare approx. 300,000,000 tons of Steam and Coking Coals per annum.

The experience gained from these installations, during the past 40 years, is at your service.

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PENNSYLVANIA CRUSHER COMPANY

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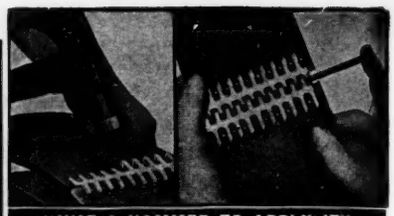
BELT LACING and FASTENERS for transmission and conveyor belts



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World famed in general service for strength and long life. A flexible steel-hinged joint, smooth on both sides. 12 sizes. Made in steel, "Monel Metal" and non-magnetic alloys. Long lengths supplied if needed. Bulletin A-60 gives complete details.

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BELT FASTENERS AND RIP PLATES

For conveyor and elevator belts of all thicknesses, makes a tight butt joint of great strength and durability. Compresses belt ends between toothed cupped plates. Templates and FLEXCO Clips speed application. 6 sizes. Made in steel, "Monel Metal", non-magnetic and abrasion resisting alloys.

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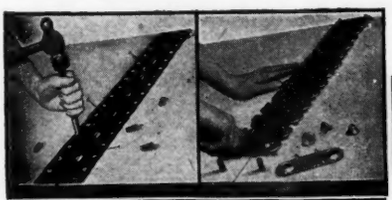
Sold by supply houses everywhere



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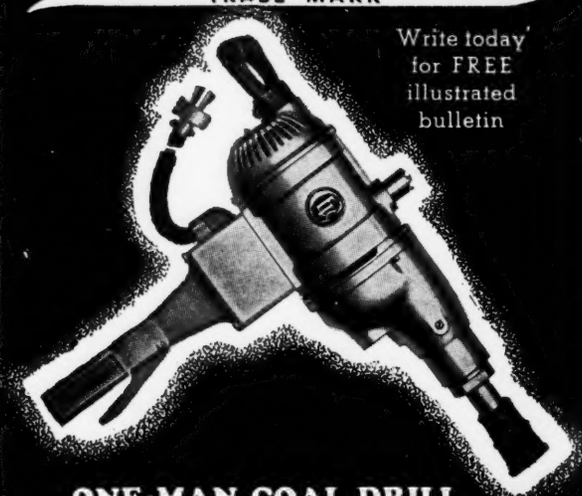

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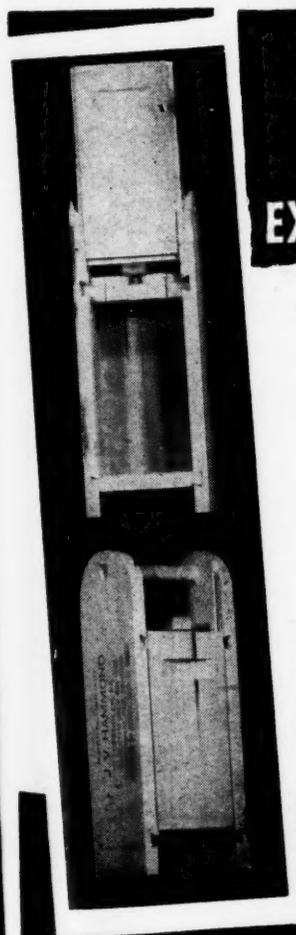

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Latest Type
SAFETY EXPLOSIVE BOXES

Approved by Penna. Dept. of Mines

Boxes are constructed entirely of wood, having no metal parts. They are of tongue-grooved and dovetailed construction, having handle for carrying, and are equipped with automatic lock using rubber bands for a spring.

NOTE: There are NO metal parts . . . conforming to regulations of the Penna. Dept. of Mines.

Important: prompt deliveries of these Hammond products: safety explosive boxes — wood tamping poles — shovel handles — robe rollers — trolley poles. Order today or write for further details.

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Boxes Made in These Sizes

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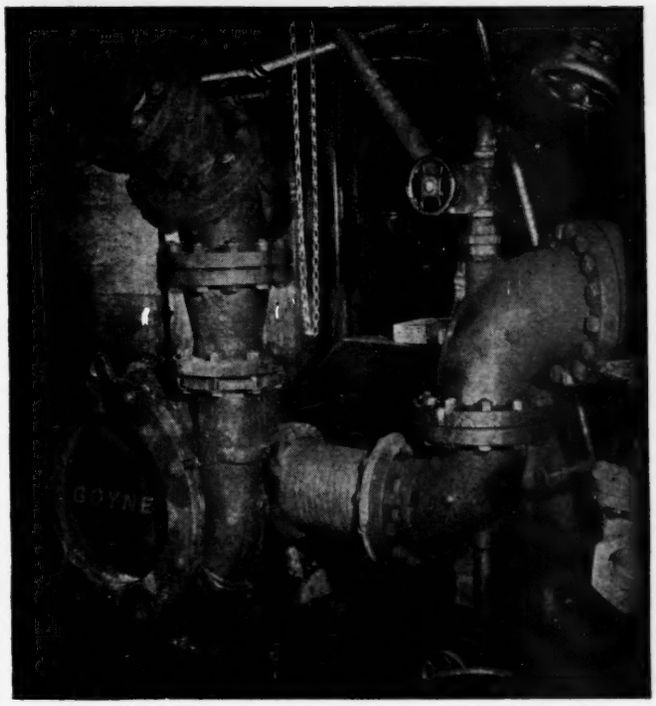
No. 16	"	"	16	"	"....1.85
No. 20	"	"	20	"	"....2.10
No. 36	"	"	36	"	"....3.60
No. 72	"	"	72	"	"....5.20
No. 6	Detonator	Box	2½x3x6	inside	...1.20
No. 8	"	"	2x2½x8	"	...1.20

J. V. HAMMOND
SPANGLER, PENNA.

GOYNE PROCESS PUMPS



A Sand Pump is only a link in a chain in a coal washing plant, but it can be a strong link if it embodies the following features as does the Goyne.

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All inquiries receive prompt and careful attention.

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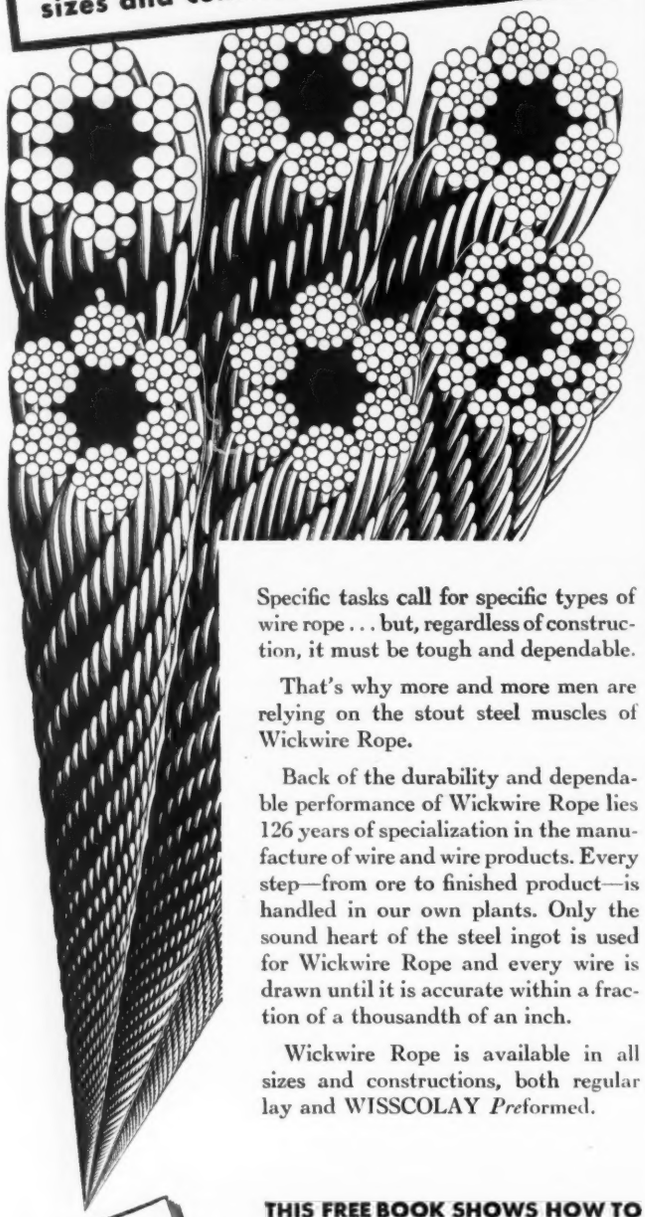
ASHLAND, PA.

WICKWIRE ROPE

sizes and constructions for every need



Specific tasks call for specific types of wire rope . . . but, regardless of construction, it must be tough and dependable.

That's why more and more men are relying on the stout steel muscles of Wickwire Rope.

Back of the durability and dependable performance of Wickwire Rope lies 126 years of specialization in the manufacture of wire and wire products. Every step—from ore to finished product—is handled in our own plants. Only the sound heart of the steel ingot is used for Wickwire Rope and every wire is drawn until it is accurate within a fraction of a thousandth of an inch.

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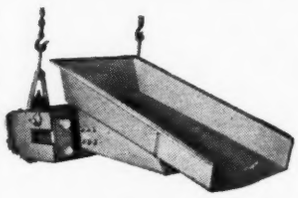
VIBRATORY FEEDERS



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—to screens, pulverizers, belt conveyors, and other coal preparation equipment. Rheostat control of rate of feed from a trickling dribble to a gushing torrent.

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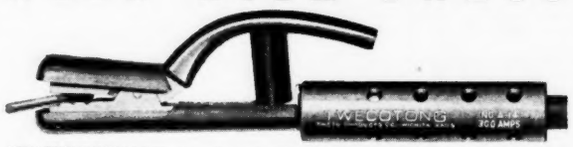
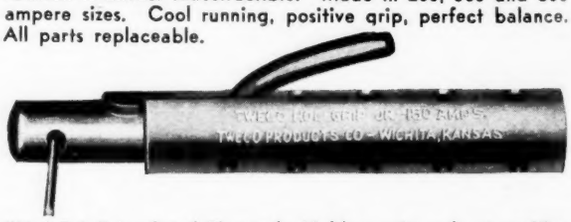


"TWECOTONG" Insulated Electrode Holders feature simplicity of design and operation. Laminated Glass Cloth Insulation is almost indestructible. Made in 200, 300 and 500 ampere sizes. Cool running, positive grip, perfect balance. All parts replaceable.



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Redhead Ground Clamps come in Midget 125 amp., Jr. 300 amp. and Sr. 500 amp. models made of high copper alloy. Features Insulated spring, clamp cable connector. Provides a portable, rugged, efficient, low cost ground.

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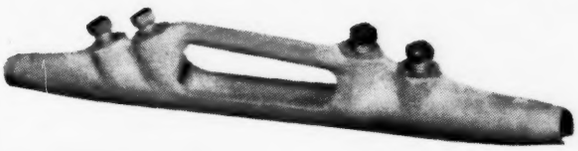
"CONNECT WITH TWECO"

• FLOOD CITY •

"BY-PASS" TROLLEY WIRE SPLICER



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When trolley wire breaks

When trolley wire breaks at the original clamp, you first install the "By-Pass" at the broken point, and fasten the clamp on the BAR AT THE TOP of this Splicer. Being fastened by the Clamp-to-the-BAR, the Splicer will have no tendency to wobble when wheels hit it. Simple! Foolproof! Saving! Write!!

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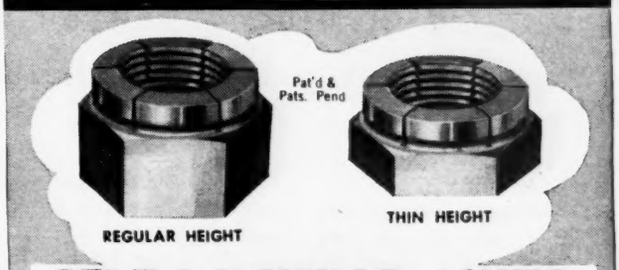

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- ASH PIT DOOR EXTENSION to protect clean sand from ashes.
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ECONOMY FLAME SPREADER in dome.

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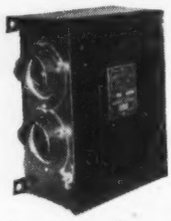

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Save Trip Time

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1—200 H.P. Double Drum Elec. Hoist with Motor
1—25 H.P. H&B Electric Hoist, with Motor
1—50 H.P. Hoist, with 250 Volt DC Motor

PUMPS—PYRAMID
2—3x4½ Goulds, Fig. 1813 with 1½ H.P. Motors
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1—3x3 Deming, Fig. 809, with 3 H.P. Motor

COAL CUTTERS
3—Sullivan CE-7 A.C. Coal Cutters, with Tip-Turn Trucks, with new Bowdil Cutter Chains & Feed Chains

MISCELLANEOUS
2/0 & 4/0 Insulated Wire 20# Plate Frogs & Switches
Electric Mine Gongs
Valves & Fittings
Wheelbarrows
1—18" Drag Chain Conveyors, 7' Centers, with 1 H.P. Motor & Speed Reducer

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Yards: Denver and Florence, Colorado

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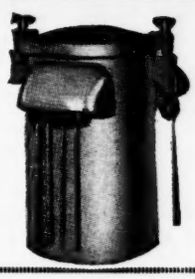

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in operating condition or burnt out. Mail us list giving complete nameplate data and stating condition.

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Station M **Since 1912** **CINCINNATI 27, OHIO**

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or, as an alternative
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Goodman Cutting Machines, used but in good operating condition, for use with 250 volt direct current.
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WANTED TO BUY
One—#7-BU
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One—#5-BU
Joy Loading Machine, used but in good condition, fully equipped and with 35 H.P. Standard Reliance Motor, for use with 250 volt direct current.
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1-2 or 2½ yard stripping shovel in good operating condition. Send full details to
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Suitable for strip mining. Complete details upon request.
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CARLYLE RUBBER PRODUCTS ARE NEW, GUARANTEED & LOW PRICED

CONVEYOR BELTING

ABRASIVE RESISTANT COVERS

Width	Ply	Top-Bottom Covers
48"	8	1/8" — 1/16"
42"	5	1/8" — 1/16"
36"	6	1/8" — 1/16"
30"	6	1/8" — 1/16"
30"	5	1/8" — 1/16"
26"	5	1/8" — 1/32"
24"	5	1/8" — 1/32"
24"	4	1/8" — 1/32"
20"	5	1/8" — 1/32"
20"	4	1/8" — 1/32"
18"	4	1/8" — 1/32"
16"	4	1/8" — 1/32"
14"	4	1/16" — 1/32"
12"	4	1/16" — 1/32"

Inquire For Prices — Mention Size and Lengths

NEW GUARANTEED

TRANSMISSION BELTING

HEAVY-DUTY FRICTION SURFACE

	Width	Ply	Width	Ply	Width	Ply
Inquire For Prices — Mention Size and Lengths.	18"	6	10"	6	6"	5
	16"	6	10"	5	5"	5
	14"	6	8"	6	4"	5
	12"	6	8"	5	4"	4
	12"	5	6"	6	3"	4

ENDLESS "V" BELTS

"A" Width All Sizes —
"B" Width All Sizes —
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Sold in Matched Sets.
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FIRE HOSE

APPROVED SPECIFICATION HOSE EACH LENGTH WITH COUPLINGS ATTACHED

I.D. Size	Length	Per Length
2½"	50 feet	$28.00
	25 "	16.00
2"	50 "	23.00
	25 "	13.00
1½"	50 "	20.00
	25 "	11.00

Specify Thread On Couplings

AIR HOSE

I.D. Size	Length	per Length	Universal Couplings
½"	25 feet	$5.00	$1.50 Pair
	50 "	10.00	1.50 Pair
¾"	25 "	7.50	1.50 Pair
	50 "	15.00	1.50 Pair
1"	25 "	10.00	1.50 Pair
	50 "	20.00	1.50 Pair

LARGER SIZES ALSO AVAILABLE
All Prices—Net — F.O.B. New York

WATER HOSE

I.D. Size	Length	per Length	I.D. Size	Length	per Length
¾"	25 feet	$4.25		35 feet	$10.50
	50 "	8.00		40 "	12.00
1"	25 "	6.25		50 "	15.00
	50 "	12.50	1½"	25 "	10.00
1¼"	25 "	7.50		35 "	14.00
				50 "	20.00

Each Length with Couplings Attached

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ROTARY CONVERTERS

500 KW G.E. SYN., 275 V., 6 Ph., 60 Cy., 1200 RPM, Pedestal Type, 2300/4000 V. Transformers.

300 KW G.E. SYN., 575 V., 6 Ph., 60 Cy., 1200 RPM, Pedestal Type, 2300/4000 V. Transformers.

MOTOR GENERATORS

150 KW G.E. SYN., 275 V., 2300 V., 3 Ph., 60 Cy., 900 RPM, Manual Switchgear.

150 KW G.E. SYN., 600 V., 2300/4000 V., 3 Ph., 60 Cy., 1200 RPM, Manual Switchgear.

LOCOMOTIVES

13-T WESTGHSE., 250 V., 908-C Mts., 36"-44" Ga.
13-T Gen. Elec., 500 V., HM827 Mts., 36"-42" Ga.
13-T Gen. Elec., 250 V., HM827 Mts., 36"-4 " Ga.
10-T JEFFREY, 250 V., MH110 Mts., 36"-48" Ga.
10-T JEFFREY, 250 V., MH-110 Mts., 44"-48" Ga.
10-T WESTGHSE., 500 V., 907-C Mts., 36"-44" Ga.
10-T WESTGHSE., 250 V., 907-C Mts., 36"-44" Ga.
8-T WESTGHSE., 500 V., 907-C Mts., 42"-48" Ga.
8-T WESTGHSE., 250 V., 906-C Mts., 42"-48" Ga.
6-T JEFFREY, 250 V., MH-88 Mts., 42"-48" Ga.
6-T WESTGHSE., 250 V., 903-C Mts., 22"-30- Ga.

Each unit listed above is owned by us and is available now for immediate purchase.

WALLACE E. KIRK COMPANY

INCORPORATED

501 Grant Building, Pittsburgh, Pa.

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7—L-400 Jeffrey, 250 volt.
5—7-BU Joy, 250 volt.
15—5-BU Joy, 250 volt.
3—#3 Myers-Whaley, 250 volt.

REBUILT LOCOMOTIVES

2—13-ton Goodman, 36-B, 250 volt.
1—10-ton G. E., HM-930, 250 volt.
3—10-ton Goodman, 34-B, 250 volt.
3—20-ton Jeffrey, MH-77, 500 volt.
2—20-ton G. E., HM-824, 500 volt.
6—8-ton Goodman, flame proof, 500 volt, 91C motors.

MINING MACHINES

12—7-B Sullivan, 250 volt. Four years old.
22—35-B Jeffrey, permissible type, 500 volt.
15—112-AA and 12-AA Goodman, 250 volt.
15—12-G3 Goodman, 220/440 volt AC.

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1—Link-Belt late type steel tipple, capacity 300-ton per hour with coal washer capacity 200-ton per hour.
Other 3, 4 and 5-track steel tipples.

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Several shaft and slope hoists——200 to 1000 H.P. motors.

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NEW and REBUILT STORAGE BATTERY

LOCOMOTIVES

1½ to 10 Ton 13" to 56" Track Gauge
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Greensburg, Pa.

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AIR COMPRESSORS—DIESELS—PUMPS

Some Steam Engines and Boilers available only slightly above the metal price

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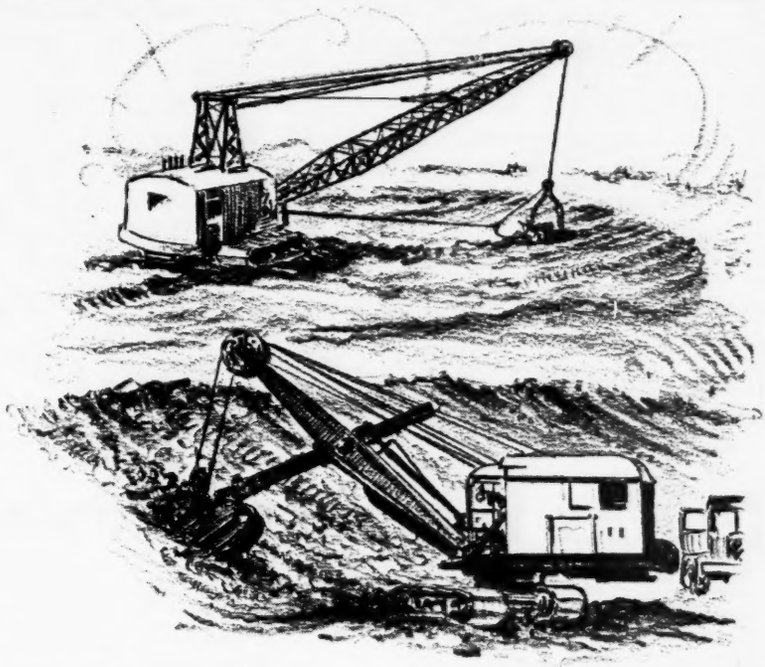

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And you may now buy it on our "Lease-Buy" plan which enables you to "Pay-as-you-Go." Phone "Collect" for details today. (Note:—Our "Lease-Buy" Plan is available to all well-rated stripping Contractors or Coal Companies.)

1½ yd.—Marion, Model 361 Shovel. Serial number in 6600s. In good condition. Minnesota.

1½ yd.—Bucyrus Erie Model 37B Shovel; D13,000 Diesel engine. Light Plant. Up-State New York.

1½ yd.—P&H Model 655a, Shovel & Dragline; D13,000 Diesel enginee; 45' boom, with extension; light plant. Machine is practically new. Maryland.

1½ yd.—1942 Bucyrus Erie 37B Diesel Dragline; 50' boom; D13,000 engine. Arksansas.

1½ yd.—Lorain 75B Diesel Shovel. Serial number in 5100s. West Virginia.

1½ yd.—Northwest Model 7 Dragline; 50' boom. Wisconsin engine. Rebuilt condition. Louisiana. Price on request.

1½ yd.—1942 P&H 655A Diesel Shovel; D1300 engine. New England area.

1½ yd.—1942 Northwest 6 shovel, crane, dragline and backhoe, 50' boom. Murphy diesel; swamp tracks. Located in Texas.

1½ yd.—brand new Marion 362 Diesel shovel. Located in Ohio.

1¾ yd.—Lima Model 750 Shovel; serial no. 610s. Close to New York City.

IMMEDIATE DELIVERY
BRAND NEW AND USED
TRACTORS

1¾ yd.—Lorain 80 Shovel; serial number in the 9500s. — rebuilt condition — Florida.

2 yd.—Bucyrus Erie, Model 44 Diesel Shovel, Serial No. in the 15,800s. Light Plant Up State.

2 yd.—Bucyrus Erie 43B Single motor electric shovel; serial number in 11,600s. 2 yd. Rock type dipper—75 HP, 2300 volts, 60 cycle AC induction type push button starter. $3000. spare parts recently purchased. Louisiana.

2 yd.—Monighan Model 2T, with new type walkers; serial no. in 3203. Louisiana.

2 yd.—Osgood model 906 shovel—35' shovel boom, 30' sticks—5 years old—Pennsylvania.

2¼ yd.—Bucyrus Erie Model 50B Electric Shovel. Serial No. in 4100s; 33' shovel boom; 19' sticks. 100HB Induction Motor, 3 phase, 60 cycle, 220 volts—1200 RPM; spare parts. Minnesota.

2½ yd.—Koehring Model 801 Diesel Shovel & Dragline. Nevada.

2½ yd.—Bucyrus Erie Model 52B Diesel Shovel & Dragline. Serial number in 11,500s—70' boom. Shovel boom — 32' — sticks — 18'. Diesel overhauled in October. California.

2½ yd.—(2) Lorain Model 95 Draglines; new in 1940. D17,000 engines; 70' booms. Louisiana.

2½ yd.—Marion Model 382 Diesel Shovel & Dragline. New in 1942; overhauled July 1946—100' boom; light plant; flood lights. Missouri.

2½ yd.—P&H 955 Diesel Dragline; serial number in 5500s; 75' boom. Motor overhauled a month ago. Florida.

2½ yd.—Brand new Northwest, Model 80D shovel and dragline—Murphy Diesel—70' boom. Light plant. Located in Texas.

3 yd.—Lima Model 1201 Diesel Shovel & Dragline; 1939 machine; 42' shovel boom; 36' sticks; 85' boom. West Virginia.

3 yd.—1942 Lima, Model 1201 Diesel Dragline 80' boom. Light Plant. Motor thoroughly overhauled. Kentucky.

3 yd.—Monighan 3T Dragline; new type walkers. Serial number in 360s; powered by practically new Fairbanks-Morse Diesel; 80' boom. Indiana.

3½ yd.—Marion 40A—hi-lift shovel, late 1946; used about 300 hours. Cummins Diesel. Located in Ohio.

3½ yd.—Brand new Manitowac stripping shovel, model 3500.

3½ yd.—Brand new Lima, Model 1201 stripping shovel.

4 yd.—P&H, Model 1055 Dragline—new in 1946—100' boom—in like new condition. Oklahoma.

5 yd.—Marion, Model 125 Electric Dragline; 80' boom; 2300 volts. West Coast.

7 yd. Marion, Model 350 Electric Shovel; 80' shovel boom; 52' dipper sticks; AC 3 phase, 60 cycle, 3800/2200 volts. Includes $20,000 spare parts; rail truck mounting can be equipped with crawlers. Mid-West location.

7 yd.—Brand new Marion 7200 Diesel electric dragline—160' boom.

20 yd.—Marion 5600 Dragline; electric powered; 3 phase, 60 cycle; 4000 volts AC; 200' boom. $75,000. worth of new parts; 20 yard brand new Page Dragline bucket. Mid-West location.

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49 Vanderbilt Ave., New York, N. Y. **Tels. MUrray Hill 4-2294-8292-2295-2296**

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Goodman: All 250 volts.
1—6 ton, 30B, 43" 1—5 ton.
1—5 ton, W-1-2, 36".
2—5 ton, 2600 K.
2—6 ton, 33-1-4-T.
2—8 ton, 32-1-4-T.

Westinghouse: All 250 volts.
1—4 ton 902, 48" with crabs.
4—904 c. 44" 500 volts and 250 volt. Also 906 motors and 102-904-115.
Bar steel frames 10 ton, 6 ton, and 4 ton.

G.E.: All 250 volt
6 ton 803, 44" as is
6 ton 823, 44"
6 ton 801
8 ton 839
Battery Locomotive, Ironton, Whitcomb and 1½ ton Mercury.
4 ton 1022, 44", as is
5 ton 825, 44" & 36"
8 ton 839 motors

Jeffrey: 6 ton and 4 ton, all gauges. 250 volt. 8 ton, 250 and 500 volts, 10 ton, MH78, 500 volts.

MINING MACHINES

Jeffrey: 28A, 250 V, 4—29B, 29C, 29CE with shearing head. Also 1 on cats. Revolving head for 29C.

Goodman: 12A, 12AB, 12AA, 12G3A, 24B.
1—12G3, 220 volt and 2—142 DA, 500 volt.
2—Permissible Type 12CA. 6—112AA. Motors for 212AA, both 250 and 500 v.
1—Hitch Cutter for Cross Head timbers.

Sullivan: CE7, CE9, CE10, CR10 Low Vein.

SUBSTATIONS — 275 volts, D. C.

1—300 KW **Westing.** Rotary.
1—150 KW **West.** Rotary.
1—200 KW 1—100 KW **Ridgway** M-G Sets.
1—200 KW **Westinghouse** M-G Set 900 RPM. 2300-270 volt.
1—100 KW **Westinghouse** M-G Set.

SPARE ARMATURES

Jeffrey MH 110, MH 78, MH 73, and MH 64-350 Volts and 500 V. 29B, 35B and 28A. **Goodman** 34B, 30B, 30C, 12A, 2600 K and R; 12AB, 12AA, 33-1-4-T, 31-1-4-T, 32-1-4-T. **General Electric** 801, 803, 807, 819, 821, 825, 839. **Westinghouse** 904, 905, 906, 102, 907, YR2, 115. Also 200 KW **Westinghouse Rotary Converter Armature,** 250 V Bracket Type, 150 KW G.E., HCC Bracket Type. **Sullivan** CE6, CE7, CE9 and CE10.

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GUYAN MACHINERY COMPANY, Logan, W. Va.

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1—12-AB Goodman with or without truck
1—CE-7 Sullivan with or without truck

SUBSTATIONS

8—Westinghouse 300 KW Rotary Converters, 6 phase, 60 cycle, 600 volt, DC, 500 Amps, 1200 RPM, complete with switchboard panels.

1—General Electric 500 KW Rotary Converter, Type HCC, 6 phase, 60 cycle, 600 volt, DC, 834 Amps, 1200 RPM, Form P, Ser. #3889122, complete with switchboard panels.

1—Westinghouse 500 KW Rotary Converter, 6 phase, 60 cycle, 600 volt, DC, 833 Amps, 1200 RPM, Ser. #2023886, complete with switchboard panels.

SUBSTATIONS

1—100-KW G.E. M-G set complete, 275 volt D.C. 2300 A.C.
1—150-KW Ridgeway M-G set complete, 275 volt D.C. 2300 A.C.
1—Extra armature and extra stator for 150-KW Ridgeway

MISCELLANEOUS

1—5 ft. Jeffrey disc fan, new condition.
1—35-HP Cargo winch complete with 230 volt D.C. Motor
1—100-HP. Reeves Natural gas engine with 62.5 KVA G.E. alternator, 220 volt with complete switchboard equipment
1—400-Amp. Lincoln welding machine with D.C. drive 230 volt
1—5 x 8' Fairmont vibrating screen
2—500 volt Goodman 212-AA cutting machine armatures
1—250 volt Goodman 212-AA cutting machine armatures
1—30-C Goodman Locomotive armature
1—30-B Goodman Locomotive armature

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1—35BB Jeffrey Shortwall A.C.
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1—124 EJ Goodman Slabbing 250 V. D.C.
1—36B Jeffrey Longwall 250 V. D.C.
1—12G3 Goodman Shortwall A.C.

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1—5 Ton Goodman with 2 Type 41 250 V. Motors
1—6 Ton Jeffrey with MH88 250 V. Motors

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1—300 HP Westinghouse Type CW 3/60/2200/600
1—185 HP Burke SC 3/60/2200/1150
1—100 HP G. E. Type I Form M 3/60-/2200/600
1—75 HP G. E. Type I Form M Slipring 3/60/440/720
1—40 HP Westinghouse CS 1800 RPM
1—30 HP Westinghouse CS 900 RPM
1—30 HP Westinghouse CS 1800 RPM
1—25 HP Westinghouse CS 1200 RPM

COAL CRUSHERS

1—36" x 36" Jeffrey S. R. Coal Crusher Gear Drive
1—18" x 18" Same Except Belt Drive

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6—Electric 1300, 1500, 2200, 5000 ft.

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100—50 ton cap. Gondolas.
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150—8000 & 10000 gal. cap. Tank Cars.
20—12 yd. Std. ga. Steel Dump Cars.
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16 yd. Elec. 160 ft. Boom Dragline.

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19—INGERSOLL RAND X59 .....$185.00 ea.
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16—CHICAGO PNEUMATIC RIVETING HAMMERS NO. 60, 1 1/16"x 6 ..... $45.00 ea.

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COAL CRUSHER
AMERICAN PULVERIZER
Type A. C. Serial No. 2258
Complete with V-Belt Sheave
Excellent condition - Immediate delivery
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TANKS—100 to 10,000 barrels
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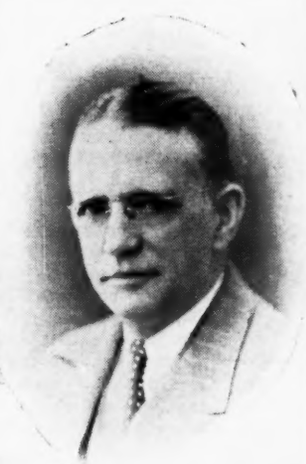
RAILROAD EQUIPMENT

What have you for sale? Send us your listings. We have a large nation-wide and foreign distribution. You may have just the equipment which someone is now asking us for.



J. PARKER THOMPSON CO., INC.

507 FIFTH AVENUE, NEW YORK 17, N.Y.

Phones MURRAY HILL 7-6547-8-9

CABLE ADDRESS: "PARKTOM" NEW YORK

PRESIDENT

WE specialize in buying complete mines that are going out of business or from receivers in bankruptcy, Administrators of estates, etc.

Frank J. Wolfe

COAL MINE EQUIPMENT SALES COMPANY

306-7 BEASLEY BUILDING — L. D. Phone-34 — TERRE HAUTE, INDIANA

AVAILABLE

IMMEDIATE DELIVERY

Rotary Converters

200 KW Westinghouse 275 V. DC 1200 R.P.M. 6 phase with transformers 2300 V. AC.

Locomotive Mine 250 V DC 42"

1—15 Ton Westinghouse Class 4-2-75-C547.
18—6 Ton Goodman Ty 33-1-4-T-2.

Locomotives Yard 36" Gauge

1—25 Ton Goodman Ty 81-O-4C Yard with cab.

Mine Cars

Large quantity 4 Ton rotary dump wood body steel frame forged steel wheels Timken roller bearing 42" gauge.

Loading Machines

17—Joy Ty 5 BU 35-K 250 V. DC.

Tipple

Allen & Garcia 4 track, 4 sizes coal complete with conveyors motor, etc.

Cutting Machines

3—Jeffrey type 29U on 42" ga. trucks, 250 V. DC motors. In very good condition.

Mine Hoists

Double shaft Wellman-Seaver-Morgan 600 ft. 1¾" rope, 600 H.P., DC Motor includes M.G. set with 10 ton fly wheel and all controls manual switch gear.

Copper

Trolley, Cable, single conductor and multi conductor various types insulation.

Miscellaneous

Aerial Tram 1400 ft., compressors, scale, fan, and many other small items.

Spare Parts

Substantial quantity spare parts all major equipment.

Inquiries Invited

B. COOL

UNION COLLIERY COMPANY

315 N. 12th Blvd. — St. Louis 1, Missouri

For Sale—

SHASTA DAM AGGREGATE PLANT AND CONVEYOR EQUIPMENT

INCLUDING:

LATE MODEL GE MOTORS, 200 HP. 1800 RPM., 2300/4000 VOLT, SLIP RING; COMPLETE WITH INTERLOCKING CONTROLLERS.

WESTERN GEAR REDUCERS, 200 HP., 40 TO 1 RATIO, HERRINGBONE GEARS.

DORR HYDROSEPARATOR, 20' x 4', COMPLETE WITH DRIVE UNIT.

8", 16" AND 20" DEEPWELL TURBINE PUMPS AND ONE 3" x 4" TWO STAGE HIGH HEAD CENTRIFUGAL PUMP, ALL COMPLETE WITH MOTORS.

30" BODINSON TRIPPER AND TRESTLE.

MISC. ELECTRICAL EQUIPMENT AND SUPPLIES.

COLUMBIA CONSTRUCTION CO., INC.
Box 579 — Redding, California

HIGH GRADE TOOLS

24"x18' American Geared Head Lathe
25"x28' LeBlond Geared Head Lathe
36"x30' LeBlond Geared Head Lathe
36"x32' American Geared Head Lathe
#1 Cleveland Horizontal Boring Mill
#0 G & L Horizontal Boring Mill
#45 G & L Horizontal Boring Mill
#2 to #5 Plain Millers
#2B Milwaukee Universal Miller
2' to 6' Radial Drills
16 ' to 24" Shapers

ALSO VARIOUS OTHER TOOLS.

Send us your inquiries.

Cincinnati Machinery Company, Inc.
217 E. Second St. — Cincinnati 2, Ohio

FOR SALE

AIR COMPRESSORS

4—Ingersoll Rand type pre-2 stationary electric air compressors. 3,072 cu. ft. capacity at 100 lb. pressure. Direct connected to G. E. 500 h.p. motors, 3 phase, 60 cycle, 2300 volts. Complete with exciter set, electrical control equipment, inter-coolers, after-coolers, air receivers and air filters. 1942 models.

Available for Immediate Shipment

ATLANTIC EQUIPMENT CO.
503 Broad St., Station Building
PHILADELPHIA, PA.
Rittenhouse 6-8583

1—Page #220 Dragline, railroad track type, 110-ft Boom, 2 yd P&H Bucket, powered with Cummings Diesel Engine, #P 7" Bore, 10" Stroke, New about 1934. Can be inspected on jobsite near Harrisburg, Ill. Price $6,900 F.O.B.

1—#3T 385 Monighan Walker Dragline, 75-ft Boom, 3-yd bucket. Powered with 150 HP GE Motor, 440 V 500 feet cable. Price $14,400 F.O.B. Jobsite.

1—8" Centrifugal Pump, powered with 8 Cylinder Buick engine 1940, Serial 271856. Price $850.00.

1—6" Sand & Gravel Pump, powered with 4 Cylinder Continental Motor #17348-E4. Good condition. Price $750.00 F.O.B. jobsite.

INDIAN HEAD COAL COMPANY
Box 326
Harrisburg, Ill.

ELECTRIC HOUSE METERS

80—Sangamo AC Watthour Meters, type H, reconditioned and recalibrated, 110 volts, 2 wire, 1 phase, 60 cycle.

Send us a list of your surplus electrical equipment and your present requirements.

R. H. Benney Equipment Co.
5024 Montgomery Rd — Norwood 12, Ohio

Better Known—Known to be Better

CALL MOORHEAD
FOR REBUILT MINING EQUIPMENT

GOODMAN SHAKER CONVEYORS
5 Goodman G 20 Shaker Conveyors with 250 v. 20 HP motors, also Goodman #3 Duck Bills.

MINING MACHINES
35 B Jeffrey 250 v. Permissible, 7½' bar.
35 B Jeffrey 500 v. Permissible, 7½' bar.
12 G3 Goodman 220 v. AC 6½' bar.
12DA Goodman 50 HP 250 v. 6' Bar, rebuilt.
35 B Jeffrey 250 v. 36/42" Ga. 6' bar.

STORAGE BATTERY LOCOMOTIVES
2—6 Ton G.E., permissible 36/44 Ga. HM 825 BB Motors, with Edison Batteries.
4 Ton 36" Ga. Atlas 2 BB Motors.
5½ Ton Type D Ironton, 42" Ga.

Haulage & Gathering Locomotives
13 Ton Westgh. 250 v. 36" or 40" Ga.
13 Ton Westgh. Bar Steel 500 v. 40/42".
10 Ton Jeffrey MH 110, 250 v. 36/42" Ga.
6 Ton G.E. 250 v. 36/42" Ga. with gath. reel.
8 Ton Goodman 9104C2 Permissible Gath. 500 v. 40/44" Ga.

COAL CRUSHERS
18x24 and 18x30 New Scottdale dbl. roll.

Rotary Con. & MG Sets (3 ph. 60 cy.)
300 KW G.E. HC 12 Rotary 275 v. 6 ph.
200 KW West. 250 v. 720 RPM—300 HP 2200 v.
150 KW Ridgway 275 v. 900 RPM dir. con. 225 HP.
50 KW 250 v. G.E.—75 HP West. 220/440 v.
50 KW G.E. 125 v.—75 HP West. 220/440.
15 KW G.E. 50 v.—25 HP G.E. 220/440.

SLIP RING & SQ. CG. MOTORS

HP	Make	Speed	WDG	Type
1500	West.	1200	Syn.	New
1000	West.	1200	Syn.	New
450*	G.E.	257	S.R.	MT
400*	G.E.	514	S.R.	I-M
400	West.	690	S.R.	CW 1106
350	West.	585	S.R.	CW
350	G.E.	900	S.R.	I-M
300*	G.E.	585	S.R.	I-M
300	West.	500	S.R.	CW
250	West.	277	S.R.	CW 1314
225	West.	585	S.R.	MW
200*	West.	700	S.R.	CW
200*	G.E.	240	S.R.	MT 412
100	West.	1750	S.R.	C-I
100	G.E.	500	S.R.	M 1-25-cy.
100	F. M.	900	Syn.	ABV
100	West.	860	S.R.	CW
75	West.	450/900	S.C.	CS
75	West.	870	S.C.	CS
50	West.	580	S.R.	CW 658 D
50	G.E.	900	S.R.	I-M
40	G.E.	900	S.R.	MTC
35	West.	870	S.C.	CS

* We can furnish G.E. Mag. contractor Cont. & Rest.

AIR COMPRESSORS
1200 cu. ft. 100# Worthington 2 stage Belted.
3—373 cu. ft. 100# Bury—AC Motors.
173 cu. ft. 100# Pres. Chic. Pneu. Belted.
90 cu. ft. 100# Pres. Chic. Pneu. Belted.
75 cu. ft. 100# Chg. Pneu-AC Motor.

PUMPS
4—2720 GPM 85' Bronze Fitted 10" Cent.
700 GPM 60' Wheeler 5" Cent.

DC MOTORS — GENERATORS, 230/250 v.

HP	Make	Speed	Wdg	Type
175	G.E.	475	ser.	MD 109
130	G.E.	550	ser.	CO 1812
100	G.E.	480	ser.	MD 108
50	Northern	600	ser.	K
50	West.	565 (500 v.)	cp.	SK
50	Reliance	1750	cp.	166 T
40	G.E. (Vert)	1750	cp.	CD 93
40	Reliance	700	cp.	T-310
40	West.	775	cp.	SK
40KW	West.	1050	cp.	SK
40	Roth	1500		
25	West.	825	cp.	SK 113
20	West.	750		
15	West.	850	cp.	SK 93
15	Wh.	800	sh.	CM
15 (4)	Cr. Wh.	1400/1700	sh.	CM
13	West. (Enc.)	825	cp.	SK 113

TRANSFORMERS
3—200 KVA Maloney 2400 v. pri. 110/220 v. sec.

HOISTS & CRANES
400 HP Vulcan conical drum Shaft Hoist driven by 400 HP G.E. slip ring 440/3/60 with rev. mag. control.
400 HP Vulcan Slope Hoist—AC Motor.
2—Fairmont Car Retarders.
10 Ton Larry Car 500/250 v. DC.
2—50/75 HP 2 drum Meade Morrison slope.
75 HP Ottomwa slope with AC Motor.
75 HP Vulcan 2 drum shaft, S.R. Motor.
40 HP Lidgerwood sgl. fr. drum geared to 40 HP G.E. slip ring 220/440 v. 3 ph. 60 cy. MTC. Rev.
30 HP Carlin double dr. fr. 13"x18"—5½" flgs.
10 HP Lidgerwood Hoist—AC or DC Motor.
5 Ton Shep.-AC Traveling Crane 35'9¼" span.

MOORHEAD-REITMEYER CO., INC. **Mayflower 7900** **Pittsburgh 19, Penna.**

Serving the Coal Industry for more than a Quarter of Century

DRAGLINE OR CRANE: Lima model 1201 with 80' boom Cummins diesel motor with long cats, with treads 42" wide, with 3 yd. and 3½ yd. dragline buckets, Koehler light plant; guaranteed condition.

NEW CONVEYOR BELT: Large quantity 42" and 60" Conveyor Belt, 6 and 7 ply 7/16" top cover, 1/16" bottom cover, 42 oz. duck. All new. Pure rubber.

VIBRATOR FEEDER: Jeffrey Traylor 6' x 6' open pan deck, powered by four No. 5 heavy M-4 motors, including motor generator equipment for 440 volt, 3 phase, 60 cycle, operation; capacity 1500 tons of earth and stone per hour, maximum size stone 3' cubes.

DISINTEGRATORS: 2—Jeffrey 24 x 18, double roll, suitable for crushing soft coal, etc.

SCREENS: 2—Allis Chalmers extra heavy, single deck, 5' x 14' with 10 H.P. motors, 440 volt, V-belt. Kennedy 4 x 8, 4 deck; 3 x 8, 3 deck. Telsmith 3 x 8, single deck. Jeffrey 48" x 78", single deck. Robins 4 x 6, 3 deck, with motor.

A. J. O'NEILL
Lansdowne Theatre Building
LANSDOWNE, PA.
Phila. Phone: Madison 8300 - 8301

WESTINGHOUSE
TYPE SK—MOTORS
America's Best Stock
WIRE INQUIRIES COLLECT
MOTORS, GENERATORS, TRANSFORMERS
1—1500 H.P.
Bought and Sold New and Rebuilt
ELECTRIC EQUIPMENT CO.
Rochester 1, N. Y.

FOR SALE
Shovels—Dragline

Model 1201 Lima High Lift Shovel. 42' boom, 32' stick, 2½ yard Amsco dipper. Cummins Diesel Engine. Excellent condition.

955 P&H Long Crawler Dragline, D17000 Caterpillar Diesel Engine. High Gantry, 90' boom, 2½ yard bucket. Just like new.

95 Northwest Dragline. 75' boom, 2½ yard Esco Bucket. Murphy Diesel Engine. Excellent Condition.

Model 850 Lima Combination Shovel and Dragline. 24' shovel boom, 18' dipper stick, 2 yard dipper. 75' dragline boom, 2 yard bucket; 18'-11" crawlers for dragline operation. 7x7 Waukesha-Hesselman oil engine. A-1 shape.

Osgood Chief combination Shovel and Dragline. 2 yard shovel front and 70' dragline boom with 2½ yard basket type bucket. Caterpillar Diesel Engine. Rebuilt.

Model 755 P&H Dragline, 75' boom, 2¼ yard Page bucket. D17000 Caterpillar Diesel Engine. Completely rebuilt.

40A Marion Dragline. 90' boom, 2½ yard buckets. D17000 Caterpillar Diesel Engine.

75 Lorain Combination Shovel, Drag and Clamshell. New Cummins Diesel Engine. Fine shape.

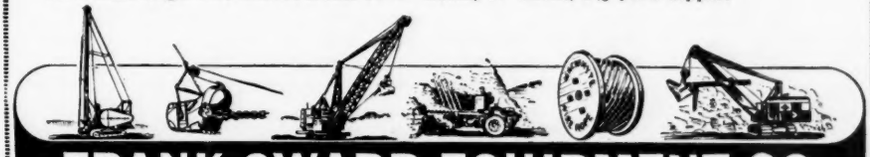
Koehring 401 Combination, 1¼ yard shovel, backhoe and dragline. Buda Diesel Engine. 60' dragline boom. Excellent Condition.

Model 83 Lorain Shovel. Long Sticks, 1¾ yard dipper. 7x7 Hesselman oil engine. Also 50' crane boom. Rebuilt.

½ yard **P&H Gasoline Shovel.**

¾ yard Type 34 Lima **Paymaster Shovel and Crane.**

1001 **Lima High Lift Shovel front.** 34'-6" Boom, 27' sticks, 2½ yard dipper.



FRANK SWABB EQUIPMENT CO.
Hazleton National Bank Bldg., Hazleton, Penna.

TEL. 4911—4910-J

FOR SALE

CRUSHERS

1—Stephens Adamson 30 x 30 double roll crusher. Will crush from 20" down to 1¼".

1—Link Belt 36 x 60 double roll crusher equipped with gear drive.

1—Pittsburg Iron Works Crusher 24 x 48 single roll, with 40 HP Allis Chalmers Induction motor, 865 rpm, 3 ph, 60 cy, 220 volts, 199 amps, Form 3K92904.

FAN

1—Bayley #17 Plexiform fan, type F, wheel diameter 93½", circumference 24.478 ft. outlet area 39.376 sq. ft. Capacity ranges from 39376 CFM at outlet velocity of 1000 to 141750 CFM at outlet velocity of 3600.

MOTOR GENERATOR SET

1—50 KW GE motor generator set, generator #416847, 182 amps, 250 volts, Form A, DLG 203, Motor type 1-6-75-1200, form K, 60 cycles, 220 volts, 75 HP, 180 amps, speed full load 1165 rpm, speed no load 1200 rpm. Complete with compensator #1083666, Form A2, type 1633, primary volts 250, secondary 881137 and switchboard #26654, 250/275 volts, 220 amps.

HOIST

1—Ottumwa silent chain drive hoist, drum inside face 30", inside flange 7", drum diameter 36", 90 teeth on big gear, 25 teeth on pinion gear, overall length 7' 9", overall width 9', overall height 5' 6", complete with 40 hp General Electric slip ring motor, 3 phase, 60 cycle, 220 volts, 900 rpm, with reversible controller and resistance. Rope speed 290' per minute. 130 teeth on chain drive gear, 16 teeth on motor pinion.

LOCOMOTIVES

1—4 ton Goodman locomotive, type 75AO4T, #5050, overall length 13' 10", width 47", height 32", wheelbase 44", gauge 28". Gauge can be changed to 24", or 42". Ball bearing motors and journals, 250 volts, DC, continuous strip grids, equalizers, and spring bumpers.

1—5 ton Goodman locomotive type W-1-2A5, #963 overall dimensions, length 11', height 30", width 47". wheelbase 31", 42" gauge.

1—6 ton Goodman locomotive #4976, type 13314T, 250 volts, ball bearing motors, 42" gauge, wheelbase 44", length 14', width 54", height 35½".

PUMPS

2—Gould pumps 6 x 12, #506477, fig. 1531, 4" suction, 4" discharge, with 7½ HP motors, 175 ft head, 114 gallons per minute.

1—Gould Centrifugal pump 3" suction, 2" discharge, capacity 225 GPM, at 105' head, complete with 10 HP Westinghouse motor, 3 phase, 60 cycle, 220/440 volts, 1750 rpm, and magnetic starter.

MINING MACHINES

1—Sullivan shortwall mining machine CE7, AC, 3 phase, 60 cycle, 220 volts, 44" gauge, 6½ ft cutter complete with tip turn truck.

2—Sullivan Longwall mining machines, 3 phase, 60 cycle, 220 volts, AC, type CH8, 30" cutter bars, complete with 300 ft each of 3 conductor mining machine cable.

We are distributors for John A. Roebling Sons Company wire rope and fittings.

GAVENDA BROTHERS
CANTON, ILLINOIS

FOR SALE

COPPER TROLLEY WIRE
4/0 Round and Grooved. Also 3/0 and 2/0

COPPER FEEDER WIRE
250,000 300,000, 500,000, 750,000 CM Bare and Insulated

Drop Bottom Mine Cars 48" Gauge

New Fabricated Landing Mats for re-inforcing, fence, mine roadways for shuttle cars, etc.

MANSBACH METAL COMPANY

Logan, W. Va. **Phone 1071**

---

110 KW Allis Chalmers Generator, V 440, Amps, 158, Cy. 60, 3-phase, RPM 1200, with control panel.
50 KW G.E. Generator, 200 Amps, speed 1200/1165, 250 V, 60 Cy., 75 HP, switch and direct current ammeter.
Jeffrey 5x2 reversible fan, steel housing, 50 HP, AC, variable speed motor, controls and resistance.
36' Jeffrey verticle single chain bucket conveyor, enclosed.
10,000 gallon Wendnagle stave water tank, 60' steel tower.
Ottumwa hoist, straight face 5' drum, clapper board and controller.
20 ton Winslow truck scale, 20' long.
400 metal miners clothes hangar baskets, chains and pulleys.
Jeffrey high duty mill crusher, 36x24 with 50 HP motor.
Williams #2 Regular Coal Crusher.
3000' 500M circular mill bare cable.
1—car puller, 3' diameter drum, 1100' ⅜" rope with 35 HP G.E. motor, 60 cy., 3-phase, AC.
Thomas Elevator dirt hoist, drum 10" diameter with 1100' ½" rope, 15 HP motor, 3-phase, 60 cy., 220 V, AC.
2—Kewanee retail yard conveyors on wheels, 5 HP motor, 3-phase, AC.

Above items for sale, for cash only, located in Central Illinois

CITIZENS COAL MINING CO.
507 Central Bank Bldg. Peoria, Ill.
Phone: 9112

FOR SALE

MINING MACHINERY

One 4 ton Jeffrey Locomotive, 250 volt D.C., 42" track gauge, trolley type.
One 30 K.W. Motor Generator set, motor 60 H.P., 2300 volt AC, Generator, 250-275 volt D.C., speed 900. Manufactured by General Electric Company.
One 100 K.W. Motor Generator set, motor 150 H.P., 2300 volt A.C. Generator, 250-275 volt D.C., speed 900 R.P.M. Manufactured by General Electric Company.
Three 50 K.V.A. transformers, 11,000 or 6600 volt A.C., to 2300 volt A.C., 60 cycle. Manufactured by Westinghouse Electric Co.
Three 10 K.V.A. transformers, 11,000 or 6600 volt A.C. to 220-440 volt A.C., 60 cycle. Manufactured by Westinghouse Electric Co.
One 75 F.P. Westinghouse Motor, 2300 volts A.C., 60 cycle.

All the above machinery is now in service and is in very good operating condition.

Contact the
AMERICAN FUEL COMPANY
Postoffice Box 409, Price, Utah

B-Erie 1¼-yd. gas-air shovel, GA-3, rebuilt.
B-E 52B 2½-yd. dragline-shovels, elec., Diesel.
Monighan 3 & 4-yd. Walking draglines.
Marion 20-yd. dragline, elec., Model 5600.
Marion 350 electric 7-yd. shovel.
Lorain 1-yd. shovel, gas, Model L-55.
B-E 50B shovels, Diesel, electric, steam.
Locomotives, 8 to 35 tons, gas & steam.
Shovel front attachment, 2½-yd., 52-55B, A-1.
B-Erie 50B parts, 60" hoist gear, drum shaft.
H. Y. SMITH CO., 828 N. B'way, Milwaukee 2, Wis.

FOR SALE

Steel River

LOADING BARGE DOCK

complete with

LOADING ROOMS

Contact the
BELMONT FUEL CO.
BANK AND TRUST BLDG.
Greensburg, Penn.

NEW STEEL TANKS

30—10,000 Gal. Cap. Horizontal.
250—4,200 Gal. Cap. Vertical.
7—42,000 Gal. Cap. Vertical.
3—5,000 & 10,000 Bbl. Cap. Vertical.

L. M. STANHOPE
Rosemont **Penna.**

COAL CRUSHERS, single roll

1—36" x 36"
1—30" x 60" Stokerkol
1—24" x 30"
1—30" x 30"
1—24" x 30" Flex tooth
1—12" x 16" Double Roll for stoker coal
1—Myers-Whaley Loading Machine, #4 Automat

GUYAN MACHINERY COMPANY
Logan, West Virginia

BATTERY LOCOMOTIVES

44 Ga. Permis.—42 Ga. Non Permis.
500—42 Ga. 3 ton Comp. Mine Cars.
15 H.P. West. SK new 1750 R.P.M. D.C. 230 V.
7½ H.P. West. SK used 1750 R.P.M. D.C. 230 V.

S. E. GANE & COMPANY
508 Grant St. **Pittsburgh, Pa.**

REBUILT EQUIPMENT—READY TO SHIP

MOTOR GENERATOR SETS

1—15 KW. 1150 rpm. 115/230 v. DC General Electric Generator direct driven by a 20 HP. 220 v. 3 ph. 60 cy. induction motor.
1—25 KVA 1800 rpm. 120 v. 208 amp. single ph. 60 cy. AC Generator with a 20 HP. type MG 115 DC Motor.
1—30 KW. 125 v. 825 rpm. type S generator direct connected to a 50 HP. 825 rpm. type S 500 v. Motor.
1—40 KW. 1200 rpm. 125 v. 320 amp. G.E. Generator direct driven by a 65 HP. 60 cy. 1200 rpm. 2200 v. Motor.
1—65 KW. 125 v. DC General Electric Generator direct driven by a 100 HP. 2200 rpm. 2200 v. 3 ph. 60 cy. Motor.
1—100 KW. 900 rpm. 550 v. Westg. Generator coupled to a Westg. 2300 v. 3 ph. 60 cy. synchronous motor.
1—150 KW. 500 v. DC Westg. Generator direct connected to a 225 HP. 2200 v. 3 ph. 60 cy. Westg. synchronous motor.

PUMPS

1— 11 GPM 460 ft. head Worthington Oil Pump.
1— 60 GPM 479 ft. head Gould Pump.
1—100 GPM 50 ft. head Dayton Dowd Pump.
1—130 GPM 50 ft. head Dayton Dowd Pump.
1—160 GPM 50 ft. head Dayton Dowd Pump
1—220 GPM 231 ft. head 3½"x3" Blackmer Pump.
2—243 GPM 100 ft. head Dayton Dowd.
1—300 GPM 90 ft. head Dayton Dowd Pump.
3—378 GPM 44 ft. head Dayton Dowd.
1—1500 GPM 90 ft. head Allis Chalmers Pump.
1—3500 GPM. 90 ft. head DeLaval Pump.
1—4000 GPM 138 ft. head Ingersoll Rand Pump.
1—450 GPM 104 ft. head Dayton Dowd Pump.
1—550 GPM 88 ft. head Dayton Dowd Pump.
1—500 GPM Morris Machine Wks. 4" sucs. 4" dis. 123" head 1760 rpm.
3—750 GPM 70 ft. head Dayton Dowd Pumps.
1—1000 GPM 45 ft. head Allis Chalmers Pump.

230 V. DC MOTORS

HP	Make	RPM	Type
30	Westg.	700	S-6
25	G.E.	650	MD
20	Westg.	600	M
20	Westg.	1100	SK
20	Westg.	975	S
15	Westg.	560	S-7
15	Al. Ch.	800	
15	G.E.	1100	CE
13½	Al. Ch.	700	
13	Cr. Wh.	1100	CM
10	Cr. Wh.	675	CCM
10	Cr. Wh.	825	CM
10	Westg.	650	S
8	G.E.	950	RC-11
1-7½	Westg.	975	S-3
5	Westg.	400	SK

ALTERNATING CURRENT MOTORS
3 ph. 60 cy.

HP	Make	Type	Volts	RPM
1	Wagner	Slprg.	220	1140
2.25	Northwestern	HEW-1½—Slprg.	440	1080
5	Westg.	C-Sq. Cg.	220	850
10	G.E.	MT-Slprg.	220	1200
10	Westg.	KT-181 Sq. Cg.	208	3600
10	Louis Allis	FX-Sq. Cg.	220/440	1730
15	Louis Allis	FX-Sq. Cg.	220/440	1750
22	G.E.	Sq. Cg.	220	1200
100	Fynn-Weischel	31-V-RN Sq. Cg.	220	900
200	Westg.	CW-Slprg.	2200	700
2-300	G.E.	I-Slprg.	2200	585
350	Allis Ch.	ANY-Slprg.	440	514
400	Westg.	CW-Slprg.	2200	435
450	Cr. Wh.	SR-Slprg.	2300	392
800	G.E.	MT-Slprg.	2200	443

COMPRESSORS

2—315 CFM Ingersoll Rand portable 100# pres. driven by 105 HP Waukesha Oil Engines, 860 rpm.

DUQUESNE ELECTRIC & MFG. CO., PITTSBURGH (6), PA.

NOW AVAILABLE

IMMEDIATE SHIPMENT

ALUMINUM

CORRUGATED SHEETS

FOR ROOFING & SIDING

22 Gauge
26" Wide
6'-8'-10'-12' lengths
2½" corrugation

CALL — WRITE — WIRE

H. H. Buncher Co.

835 SHORE AVE.
PITTSBURGH, PA.

WIRE ROPE

Brand New—On Original Reels
200,000 Ft. Hemp Center

Manufactured to Navy specifications by the nation's largest Wire Rope Company

160,000 ft.— ¾"—6 x 37 Improved Plow Steel Preformed
15,000 ft.— ⅞"—6 x 12 Plow Steel Galvanized
6,000 ft.—1¼"—6 x 37 Plow Steel Galvanized
19,000 ft.—1¼"—6 x 37 Plow Steel

This rope is clean—just like from the factory. In original cases—with approximately 600 ft. per reel.

Substantial Discounts on large Quantities
Buy now and store for future use.

Wire Write Phone

BROWN-STRAUSS CORP.

Box 78 Phone HA. 1000 K. C. Mo.

1—Main shaker shaft 6 in. Diam., 16 ft. 9 in. long with 4-21 inch x 14 inch cast iron boxes babitted and 4-15 inch Diam. cams with 4 inch face, straps and arms to match —complete for your sizeing decks $10,000.00

1—Set compound crusher rolls 29"x24" chilled steel removable segments—drive gear 48"x6" face $1,800.00

Numerous other items of coal mine and preparation equipment.

Write post office box 326
Pittston, Pennsylvania

FOR SALE

RELAY RAIL & BARS

250 tons 100# ASCE • 1500 tons 90# ARAB—250 tons 90# ASCE • 250 tons 80# Dudley

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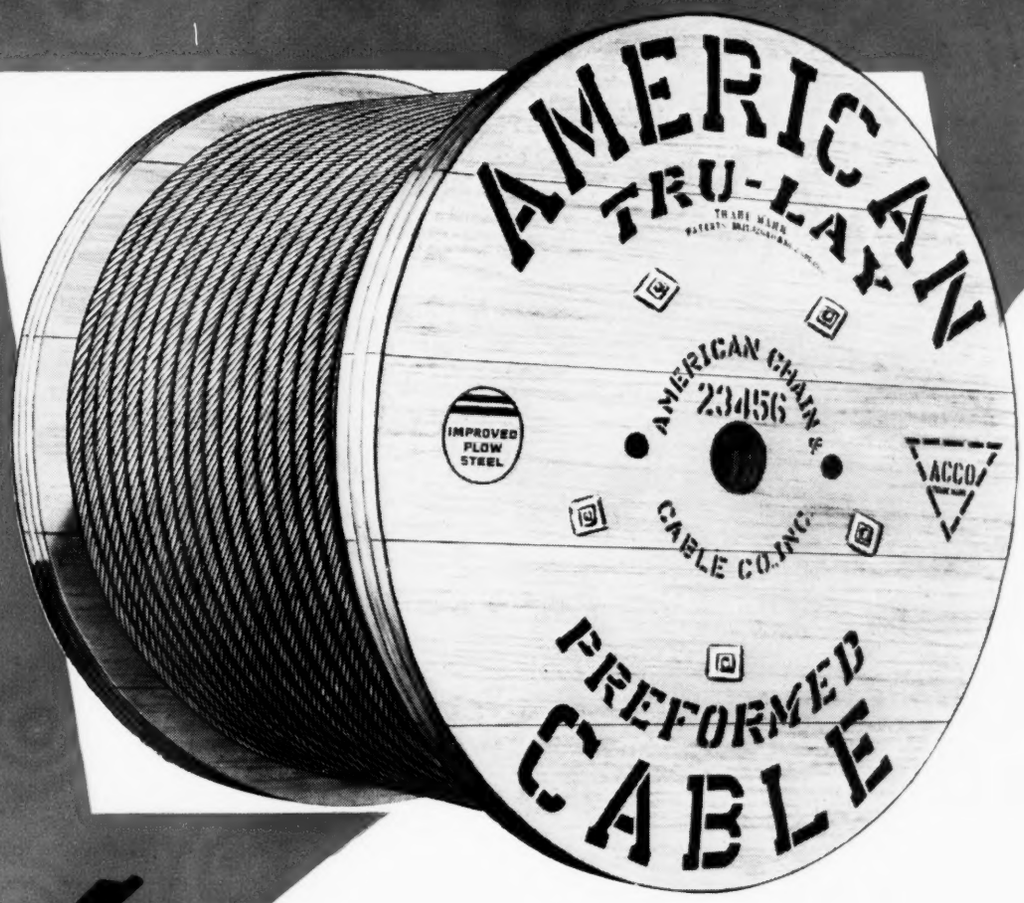

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